UGANDA PROTECTORATE.

ANNUAL REPORT

OF THE

DEPARTMENT OF AGRICULTURE

FOR THE

YEAR ENDED 31ST DECEMBER, 1931.

(PART I).

Published by Command of His Excellency the Governor.

ENTEBBE:

PRINTED BY THE GOVERNMENT PRINTER, UGANDA.

1932.

IMPERIAL MYCOLOGICAL INSTITUTE
14 NOV. 1932

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Addresses of Officers and Telephone Numbers:

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HEAD OFFICE	Entebbe ...	2 ...	91
SENIOR AGRICULTURAL OFFICER	Kampala ...	281 ...	15
AGRICULTURAL LABORATORY AND KAMPALA PLANTATION	Kampala ...	265 ...	18
BOTANIC GARDENS	Entebbe ...	60 ...	38
JINJA OFFICE	Jinja ...	67 ...	101—105

PRINCIPAL EXPERIMENT STATIONS:

(1) Kampala, Mengo. (2) Serere, Teso. (3) Bukalasa, Mengo.
(4) Bugusege, Bugishu. (5) The Botanic Gardens, Entebbe.

SUBSIDIARY STATIONS:

(1) Ngetta, Lango. (3) Wanyange, Busoga.
(2) Kamuge, Bugwere. (4) Kakumiro, Mubende.

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STAFF LIST.

Director of Agriculture	J. D. Tothill, D.Sc. (Harvard), B.Sc. (Toronto).
Deputy Director of Agriculture	L. Hewett, M.R.A.C. (to 13th July). G. F. Clay, M.C., B.Sc. (Edin.), N.D.A., N.D.D. (Hons.). (from 14th July).
Statistician	H. G. Smith.
Office Superintendent	G. A. Read.
Clerk	A. J. Dowse.

GENERAL DIVISION.

Senior Agricultural Officers	G. F. Clay, M.C., B.Sc. (Edin.), N.D.A., N.D.D. (Hons.) (to 13th July). A. B. Killick, B.Sc. (Lond.), Dip Agric. (Wye). C. E. J. Biggs, B.Sc. (Lond.), Dip. Agric. (Wye) (from 14th July).
Superintendent of Agricultural Education ...	E. G. Staples, M.A., M.R.A.C., Dip. Agric. (Cantab.).
Agricultural Officers	R. T. Wickham. C. E. J. Biggs, B.Sc. (Lond.), Dip. Agric. (Wye) (to 13th July). D. Stedman-Davies, B.Sc. (Wales). N. S. Haig, B.Sc. (Lond.), Dip. Agric. (Wye). E. F. Martin, Dip. Agric. (Harper Adams and Northants). W. T. O. Maidment, B.A. (Cantab.). H. L. G. Milne, N.D.A. A. J. Kerr, B.A. (Cantab.), A.I.C.T.A. R. P. Davidson, B.Sc. (Edin.), N.D.A. W. J. M. Irving, B.Sc. (Edin.) (from 8th October). J. D. Jameson, B.A. (Oxon.), A.I.C.T.A. (from 26th September). W. J. Badcock, Dip. Agric. (Reading), N.D.A. (from 20th November).
Agricultural Officers (Education)	C. W. L. Fishlock, B.Sc. (Lond.), B.Sc. (Reading), A.I.C.T.A. R. W. Stuckey, M.A. (Cantab.), B.S.A. (McGill), A.I.C.T.A. M. G. De Courcy-Ireland, B.A. (Cantab.)
Coffee Officer	W. L. Munn.
Tobacco Officer	G. T. Philpott.
Cotton Grader and Ginning Inspector ...	Major N. G. Wright.

Plantation Managers :—

Capt. J. S. Harmsworth, M.C. — E. A. Ruck.
C. Hazel. — A. L. Stephens.
P. Chandler.

Ploughing Instructors :—

J. K. Shepherd. — W. Gray.

AGRICULTURAL LABORATORIES.

Government Entomologist	H. Hargreaves, A.R.C.S., D.I.C., F.E.S.
Assistant Entomologist	G. L. R. Hancock, M.A. (Cantab.), F.E.S.
Mycologist	C. G. Hansford, M.A. (Cantab.), F.L.S.
Economic Botanist	J. D. Snowden (till 21st September).
Cotton Botanist	G. W. Nye, B.Sc. (Lond.), Dip. Agric. (Wye).
Assistant Cotton Botanist	H. R. Hosking, B.Sc. (Lond.), A.R.C.S.
Agricultural Chemist	W. S. Martin, Ph.D., M.Sc. (Lond.), A.R.C.S., D.I.C., A.I.C.
Assistant Agricultural Chemist	G. Griffith, Ph.D., B.Sc. (Wales), A.I.C.T.A.

CLERICAL STAFF.

Clerks :—

J. C. S. De Souza. — M. A. S. Menezes.
A. S. Remedios. — F. C. De Sousa.

DEPARTMENT OF AGRICULTURE.

ANNUAL REPORT

FOR THE YEAR ENDED 31ST DECEMBER, 1931.

PART I.

1. In accordance with the practice instituted last year this Report is divided into two parts:—Part I. deals with the administrative side of the departmental activities and gives a review of the agricultural position of the Protectorate during the year, and Part II. contains a report on the scientific work and results of experiments conducted during the year.

Staff.

2. The following are the principal staff movements and changes during the year:—

DR. J. D. TOTHILL, Director of Agriculture, proceeded on home leave on 23rd April and returned from leave on 17th December, 1931.

MR. L. HEWETT, Deputy Director of Agriculture, retired on pension on 14th July, 1931.

MR. G. F. CLAY, M.C., Senior Agricultural Officer, was promoted to the post of Deputy Director of Agriculture on July 14th, 1931, and acted as Director of Agriculture from April 20th to December 22nd, 1931.

MR. A. B. KILLICK, Senior Agricultural Officer, returned from leave on 16th January, 1931, and acted as Deputy Director of Agriculture from April 20th to December 22nd, 1931.

MR. C. E. J. BIGGS, Agricultural Officer, acted as Senior Agricultural Officer from March 14th to July 13th, and was promoted to the post of Senior Agricultural Officer on July 14th, 1931.

MR. D. STEDMAN-DAVIES, Agricultural Officer, acted as Senior Agricultural Officer from 20th April to 22nd December, 1931.

The following Agricultural Officers assumed duty on the dates shown, on first appointment to the Protectorate service:—

MR. W. T. O. MAIDMENT, transferred from the Gold Coast, 20th June, 1931.

MR. W. J. M. IRVING, 1st November, 1931.

MR. W. J. BADCOCK, 17th December, 1931.

MR. J. D. JAMESON was also appointed to the post of Agricultural Officer, but proceeded to South Africa to undergo a course of instruction in cotton selection work at the Empire Cotton Growing Corporation's research station at Barberton and will not assume duty in the Protectorate until the middle of 1932.

MR. J. D. SNOWDEN, Economic Botanist, retired on pension on 23rd September, 1931.

The following officers were absent from the Protectorate on home leave during a part of the year:—

Dr. J. D. Tothill, Director of Agriculture.

Mr. L. Hewett, Deputy Director of Agriculture.

Mr. A. B. Killick, Senior Agricultural Officer.

Mr. E. G. Staples, Superintendent of Agricultural Education.

Mr. H. Hargreaves, Government Entomologist.

Mr. H. R. Hosking, Assistant Cotton Botanist.

Mr. R. T. Wickham, Agricultural Officer.

Mr. D. Stedman-Davies, Agricultural Officer.

Mr. E. F. Martin, Agricultural Officer.

Mr. M. G. de Courcy-Ireland, Agricultural Officer.

Mr. C. Hazel, Plantation Manager.

Mr. P. Chandler, Plantation Manager.

Mr. E. G. Gibbins, Laboratory Assistant.

3. Mr. L. Hewett, Deputy Director of Agriculture, went on leave in April, prior to retirement. Mr. Hewett's first appointment to the Protectorate Service was that of Assistant Superintendent of Cotton Cultivation, on the 9th July, 1911. He was promoted to the post of Deputy Director on the 1st April, 1919, and has on many occasions acted as Director of Agriculture.

4. Mr. J. D. Snowden, Economic Botanist, went on leave in June, prior to retirement. Mr. Snowden entered the Protectorate Service on 20th March, 1911, as Assistant Agricultural Officer, and acted at various times as Botanist, Mycologist and Senior Agricultural Officer. He was promoted to the post of Economic Botanist on the 26th September, 1930.

5. I wish to record my appreciation of the loyal services rendered by all members of the staff during the year.

General.

6. The rainfall for the year was generally above normal. Weather conditions were normal in the first half of the year and the planting of food crops was carried out under good conditions.

The usual dry spell was experienced in June, and the bulk of the cotton crop was planted under excellent conditions. Good weather conditions continued up to the end of September and at that period there was every indication of a record cotton crop. Heavy rains continued in most parts throughout October and November and the dry weather did not set in until the latter half of December.

The effect of these conditions on the cotton crop in the latter half of the year was to cause excessive vegetative growth and shedding of buds and bolls with a consequent adverse effect on yield.

Locusts.

7. An outstanding feature of the year was the wholesale invasion of the Protectorate, along with the adjoining territories, by the Hairy Chested Locust (*Locusta migratoriodes*). Reports of the arrival of swarms were first received in early January from the West Nile District and by the end of the month the swarms had arrived at the eastern boundaries of the Protectorate.

The original invasion was later reinforced by fresh swarms entering from the Sudan and from the Belgian territory to the west of the Ruwenzori group, and most parts of the Protectorate were ultimately visited by this species. First reports of egg laying were received in March and the main egg laying period was in the months of March and April. Hoppers hatched out in about three weeks, and the duration of the nymphal instars was approximately two to two-and-a-half months.

As soon as it became evident that an infestation on a large scale was to be expected Government set up a Locust Control Committee and placed funds at its disposal. After due consideration of the conditions in Uganda it was decided to confine

operations to direct communal action by natives in inhabited areas and provision of poison for use in cases where non-native plantations were threatened.

In all provinces organised action by the native population, supervised by the chiefs, was taken against eggs and hopper bands, such action being confined to digging up of eggs, beating, trenching and burning of hoppers.

In addition, as soon as it was known that this species of locust attacked mainly graminaceous plants, natives were encouraged to plant crops believed to be immune to this species, such as cassava, sweet potatoes and groundnuts.

The result of this policy was that, although many tribes of the Protectorate are mainly grain eaters, in very few cases was it necessary for Government to institute famine relief measures, whilst the wholesale destruction of hoppers wrought by the native population, more particularly in the short grass areas of the Protectorate, resulted in a comparative freedom from the next generation of flying locusts.

Sporadic egg laying occurred at various times throughout the year, but the resulting hoppers were in most cases effectively dealt with by the local population.

At the request of Government, the Imperial Institute of Entomology made available the services of Mr. H. B. Johnston, Chief Locust Investigator, Imperial Institute of Entomology, and he arrived in the Protectorate in October, but during the period of his visit the Protectorate was "comparatively free from locusts."

The following extracts from a report written at the conclusion of his stay in Uganda are of interest:—

> "This country presents some peculiar difficulties which strongly militate against extensive measures over wide areas. These are the very unequal density of population, the presence of large sleeping sickness reserves and the occurrence of a particularly dense tall grass vegetation occupying a large portion of the south and centre of the country. That certain sleeping sickness reserves present peculiar difficulties is clear. Far too great a risk is involved in introducing large numbers of natives into these areas, to which consideration must be added difficulties involved in the provision of food and the establishment of isolation camps over a long period. The undertaking of any such work would involve special organisation on a very large and costly scale. In the present state of our knowledge of locust control such undertakings are probably not justified.
>
> "In regard to the employment of mechanical methods definite rules cannot be laid down since the methods must be continued to suit the particular emergency. In the cases observed in Uganda the means seemed to be adequate for dealing with small and medium sized bands of hoppers, and the organised use of poison bait was hardly called for.
>
> "It may be stated that where the use of mechanical methods is established an effort should be made to improve them rather that to abolish them. Success must mainly depend on the efficiency of scouting, the obtaining of sufficient labour and the provision of a certain amount of European supervision to ensure a careful carrying out of instructions."

Further details of observations made on this species of locust, and of experiments conducted in the use of various poison baits will be found in Part II. of the Report in the Report of the Entomologist.

Exports.

8. The total value of domestic produce exported from the Protectorate during the year amounted to £1,978,262, compared with £2,060,453 for the preceding twelve months.

With the fall in the value of all primary produce, which was a feature of the year under review, the above figures must be regarded as satisfactory.

An analysis of the table giving comparative figures in respect of the years 1930 and 1931 will show that a considerable increase in the major items of agricultural exportable produce has taken place.

The value of ginned cotton and cotton seed exported amounted to £1,652,531, representing 188,920 bales of the former, and 45,435 tons of the latter, or 83·5% of the total exports, compared with the corresponding figures of £1,692,731, 129,122 bales, 33,578 tons or 82·2% in 1930.

A table showing the details of exports for the years 1930 and 1931 is given below, and comparative tables for the past five years will be found in appendices:—

Description.	Unit of Quantity.	1930. Quantity.	1930. Value.	1931. Quantity.	1931. Value.
			£		£
Cotton, raw	*centals*	516,489	1,555,344	755,680	1,503,307
Coffee, raw	*cwts.*	48,856	154,995	69,990	161,389
Cotton seed	*tons*	33,578	137,387	45,435	149,224
Sugar, refined	*cwts.*	6,670	8,718	44,995	46,576
Hides, dry and dry salted	*cwts.*	21,492	49,518	19,799	36,696
Metalliferous ores, non-ferrous	*tons.*	351	55,300	170	24,436
Ivory	*cwts.*	302	13,632	405	16,184
Cigarettes	*lbs.*	20,707	5,405	46,474	12,345
Tobacco	*lbs.*	123,659	5,544	133,597	5,185
Chillies	*cwts.*	3,078	7,573	2,814	5,515
Skins, Sheep and Goats	*No.*	205,200	7,670	130,670	5,226
Simsim	*tons*	1,416	17,964	350	3,799
Rubber, plantation	*centals*	6,270	16,814	1,334	2,291
Groundnuts	*tons*	1,289	15,123	215	2,076
Other exports	*Value*	...	9,467	...	4,013
		...	£2,060,454	...	£1,978,262

Cotton.

9. (*a*) *1930-31 Crop.*—The cotton buying season opened on the 19th January. The output from the Eastern Province was 67,323 tons of seed cotton, as compared with 30,406 tons in the previous year.

In Buganda Province the total purchases amounted to 33,575 tons, as against 38,772 tons in the 1929-30 season. The Northern and Western Provinces produced 8,227 tons, as compared with 4,476 tons in the previous year.

Thus altogether a total production for the Protectorate of 109,125 tons was recorded, being the equivalent of 183,330 bales of lint of 400 lbs. each.

(*b*) *1931-32 Crop.*—The table below gives the approximate figures of acreages planted in the various districts during 1931. The figures for 1930 are given for comparison:—

	1931.	*1930.*
EASTERN PROVINCE.		
Busoga District	137,887	132,890
Budama „	36,827	31,816
Bugwere „	112,101	107,484
Bugishu „	47,592	26,793
Teso „	115,626	118,813
Lango „	52,483	66,757
TOTAL ACRES	502,516	484,553
BUGANDA PROVINCE.		
Mengo District	145,285	99,506
Entebbe „	70,349	41,023
Masaka „	39,090	25,600
Mubende „	36,941	28,500
TOTAL ACRES	291,665	194,629
NORTHERN PROVINCE.		
Bunyoro District	16,550	15,000
Gulu „	26,200	19,915
Chua „	12,248	12,000
West Nile „	5,050	6,580
TOTAL ACRES	60,048	53,495
WESTERN PROVINCE.		
Toro District	4,847	6,000
Ankole „	6,183	1,013
TOTAL ACRES	11,030	7,013
GRAND TOTAL	865,259	739,690

In all provinces record acreages were planted, and in most areas planting was carried out under good conditions. Good growing conditions continued up to the end of September and at that stage there was every indication that a new record in cotton production would be established. The plants at this stage in most areas had made excellent vegetative growth.

In the eastern districts of the Eastern Province favourable conditions continued throughout the growing season and at the end of the year there were indications of high yields in Busoga, Budama, Bugishu and in the eastern half of Bugwere district.

In Teso and Lango districts the unusually dry conditions obtaining in October seriously reduced the prospects by inducing bud and boll shedding.

The following extract from the report of the Senior Agricultural Officer, Buganda, summarises conditions in that province:—

> "The weather from June to the end of August was most favourable for planting and at this time there was every prospect of a record yield. Unfortunately, however, the wet weather continued until the middle of December with the result that the majority of the plants developed too much woody growth at the expense of bud and boll production. In addition the pest *Lygus* appeared in September, and the disease Black Arm in October. A change to drier conditions at this time would undoubtedly have saved the crop but the continuance of heavy rains throughout November and up to the middle of December continued also to favour the growth of wood and spread of disease. By the middle of December therefore the lower bolls had been ruined and many of the later bolls had diseased locules. This condition was caused primarily by adverse weather as the effect of the other factors was less significant in view of the strength of the plants at the end of the rains.
>
> The change over to dry weather in the latter half of December was followed by an immediate improvement in the condition of the crop. The spread of rot was checked with the growth and ripening of bolls, and at the end of the year the prospect was more encouraging."

Similar conditions to those experienced in Buganda prevailed in most parts of the Northern Province.

The result of these adverse weather conditions in the latter half of the year was to decrease prospects by December to 200,000 bales, whereas given an average yield in each district a total production of nearly 240,000 bales could have been anticipated.

(*c*) *Distribution of S.G. 29.*—In the Eastern Province, where a scheme for the systematic introduction into native cultivation of improved strains of cotton produced by the Cotton Botanist was inaugurated in 1929, a total acreage of 55,499 acres was planted with S.G. 29, the latest strain to be introduced into general cultivation.

(*d*) *Pink Bollworm.*—An investigation carried out by the Agricultural Officer, Masindi, early in 1931, revealed the fact that Pink Bollworm (*Platyedra gossypiella*) has entered the Protectorate for the first time, and further investigations carried out by the Entomological section indicated that a considerable area of the Northern Province had become infested with this cotton pest. Indications so far are that the infestation is sparse.

This pest was known to exist in the Mongalla Province of the Anglo-Egyptian Sudan and in the Uele Province of the Belgian Congo and in anticipation of the entry of this pest into Uganda, steps had been taken to retard its spread by closing the West Nile district and the Madi sub-district of Gulu district for the export of seed cotton and cotton seed. It was hoped by this means to confine the pest to the areas west of the Albert Nile, but as mentioned above, later investigations by the Entomological section proved that the pest had already established itself in the Gulu district. As a result of this knowledge a fresh area covering all the area known to be infested was declared closed for the export of seed cotton and cotton seed.

(*e*) *Ginneries.*—The number of ginneries licenced to gin and bale cotton during the year was 127, as compared with 123 in 1930.

Ginnery holdings at the end of the year were as follows:—

	Number of Ginneries.
Indian	155
European	33
Japanese	6
TOTAL ...	194

(*f*) *Transport.*—Motor transport used in connection with the purchase of seed cotton was introduced in 1927, and sufficient time has now elapsed to see the effect of the system, which has since become general, on some agricultural problems besetting the cotton industry.

The system undoubtedly facilitated the sale of cotton by producers and when cotton prices were high its cost was of secondary importance. With pre-war prices now ruling, however, this original value of the system has largely disappeared because although producers can sell their cotton readily the cost of lorry transport causes a substantially lower price to be paid. It is, however, with the agricultural effects that I am more particularly concerned in this report.

In order to appreciate the following it may be stated that the use of lorries has had the natural general effect of widening the purchasing area of each ginnery and that it has now become not uncommon for cotton to be purchased at a point 60 miles or so distant from its ultimate ginnery.

In the first place this has had the effect of greatly increasing the rate of distribution of such pests as Pink Bollworm and Black Arm disease, both of which are carried in seed cotton. It has become increasingly difficult for this reason to issue seed none of which has been produced in a Black Arm area.

The mixing of growths is also becoming more frequent. For instance, when the north Lango crop is a poor one and the south Lango crop a reasonably good one, the mixing of the two through the widened purchasing radius of ginneries has become inevitable.

The mixing of good raw and ordinary raw cotton of the same growth has also become more difficult to prevent through the increasing congestion at the markets brought about by the more rapid marketing due to the use of lorries.

It has finally become increasingly difficult to keep the new and improved strains such as S.G. 29 pure beyond the 5,000 acre multiplication stage.

(*g*) *Local Trading.*—During the year local transactions in baled cotton were again numerous, and particulars of 1,861 registered contracts, representing 251,167 bales, were recorded.

It is considered that the introduction of machinery for arbitration in these local transactions would be beneficial and consideration is being given to this point.

(*h*) The following table gives details of the principal countries to which direct shipments of cotton were made during the year and the details in regard to the two previous years are added for purposes of comparison :—

	1931.		*1930.*		*1929.*	
	Bales.	%	*Bales.*	%	*Bales.*	%
Great Britain ...	16,665	9	9,197	7	44,726	22
India	171,502	91	112,573	88	118,529	60
Japan	236	—	6,814	5	35,139	18

(*i*) *Legislation.*—During the year several amendments to the Cotton Ordinance, 1926, were effected.

Amongst these amendments was one giving the Governor power to proclaim any area within the Protectorate to be a segregated area, for the purpose of increasing the seed supply of any species or variety of cotton, and in any such area control of planting, marketing and ginning of the cotton is vested in the Director of Agriculture.

In addition, the Cotton (Tax) Ordinance was repealed and replaced by a Cotton Export Duty Ordinance.

In the new Ordinance, as in the old, the basis of the tax is the price of American Middling Cotton, but July futures in December are substituted for those of June. In addition the scale of taxation has been amended, the lowest value at which the tax becomes operative being 5·01d. as against 6·01d in the previous Ordinance.

Coffee.

10. Details of the total acreage of this crop under cultivation both by non-natives and natives are given in the following table, and the corresponding details in respect of 1930 are given for comparison :—

	Coffee Arabica.		*Coffee Rubusta.*	
	1931.	*1930.*	*1931.*	*1930.*
Non-natives	10,837	13,449	6,722	5,679
Natives	7,498	6,672	14,157	15,816
	18,335	20,121	20,879	21,495

With the continued depression in the world price of this commodity there was little incentive to increased planting on estate lines and the year under review must be considered one of the most trying that the planting industry has experienced in the Protectorate.

Development of native grown coffee continues to expand and at the end of the year it was estimated that over 2,000 acres of coffee arabica were under cultivation by natives in the Bugishu district of the Eastern Province in the foothills of Mount Elgon, whilst in the Ankole district of the Western Province over 1,200 acres of the same species are established.

With a view to improving the quality of coffee exported from the Bugishu area, a scheme for the better treatment of the coffee after picking was put into operation, during the year.

This consists of the erection of a Native Administration Central Coffee Factory complete with facilities for artificial drying, hulling and grading of the coffee, and the establishment at various centres of permanent and temporary pulping stations where facilities exist for wet pulping, fermenting and partial drying prior to shipment to the central factory.

Efforts are being made to induce the native growers to market their coffee in the cherry at these pulping stations. It is hoped by this method to obtain a more uniform type of bean for export, as under the previous system growers pulped their own cherry, returned with the wet parchment to their homes, and the inadequate facilities for correct fermentation, washing, etc., led to the marketing of parchment coffee of a very irregular grade, much of it being insufficiently washed and underdried.

More particularly in native coffee cultivation, efforts have been made during the year to encourage the mulching of coffee with plantain trash or elephant grass, and considerable success has been attained.

Several non-native planters are also adopting this practice and the Coffee Officer reports that :—

> "Planters are still adhering to overhead shade instead of mulching. On a few estates however mulching has been carried out successfully and there has been a marked improvement in the appearance of the trees and in the crop."

The Coffee Board met on three occasions during the year and gave valuable advice on the question of the rules and schedule of grades to be made under the Coffee Grading Ordinance, 1930.

The exports of coffee from the Protectorate during the year amounted to 69,990 cwts., valued at £161,389, as compared with 48,856 cwts., valued at £154,996, for 1930.

Tobacco.

11. (*a*) The development of tobacco growing as a native crop in Bunyoro district continues to make progress, and the crop marketed in September amounted to 367,041 lbs. from a total acreage of approximately 760 acres, an average of over 480 lbs. of marketable leaf per acre.

The greater part of this crop was purchased for use at the factory of the British American Tobacco Company at Jinja.

The average price paid to the growers was 24·75 cents per lb.

"Pole-burn," brought about by exceptionally wet weather conditions combined with rather low temperatures during July, after the leaf had been harvested, was responsible for considerable loss, both in quality and quantity. Hail was also responsible for some loss, particularly in areas where the crop had been late planted.

It was decided for various reasons to discourage the planting of two crops per annum, and as a result only approximately 120 acres were planted in September. One reason for limiting to one crop yearly is the fact that where natives grow two crops, the preparation of nursery beds for the second crop coincides with the period of curing in the barns, and there is a tendency for both operations to be neglected at such a time. Again experience has shown that the crop sown in September is generally inferior to the main crop and finally the control of pests is simpler with a wide interval of time between crops.

The second crop planted in September suffered from unusually heavy rains in the latter half of November and early December, after "topping" had taken place, and a serious outbreak of "rust" (*Macrosporium longipes*) resulted, and seriously affected yield prospects from this crop.

During the year the Government purchased slightly more than 13,000 lbs. of native grown leaf for shipment to England.

The completion of the packing factory at Masindi enabled this shipment to be regraded, conditioned and packed. With a view to obtaining as full a report as possible roughly half the amount was shipped to London and half to Liverpool, and in each case a proportion was shipped as bales and a proportion in wooden cases.

Of the amount purchased from natives by Government, 5,411 lbs. or 41·22% was lost in regrading, redrying and stripping. The loss consisted of 1,210 lbs. stems, 1,028 lbs. moisture, 306 lbs. sweepings and 2,867 lbs. discarded leaf.

With a purchase price to the grower of 30 cents for first grade and 20 cents for second grade leaf, the all-in cost of landing leaf in England worked out at 72·93 cents per lb., exclusive of interest charges or officials' salaries.

As sales had not been effected at the end of the year it is not possible to give details of the price realised.

(*b*) In the matter of seed production and selection the following extract from the Tobacco Officer's report is of interest:—

> "Brokers who have handled Uganda leaf have often commented upon the fine spread of the leaf and every effort is being made, by careful selection of seed plants, to maintain this feature, a most important point in view of the fact that it has been stated that African tobaccos are inclined to run narrow after a few years."

During the year a seed grader has been installed in the office of the Tobacco Officer, and all seed sent out is now graded and disinfected before despatch, and all seed for use by natives is similarly treated.

Seed production by the department is carried out at the Bulindi experiment station and fourteen varieties were grown there during the last year. Only three or four of these are types suitable for the European market, the remainder being chiefly required for blending purposes at the factory of the British American Tobacco Company at Jinja.

Experiments in the growing of air-cured leaf were carried out during the year in the West Nile and Mubende districts, and results were promising. The varieties used were "White Burley" and "Hickory Pryor."

(*c*) The acreage under tobacco on non-native estates is still comparatively small, a total acreage of 269 acres being recorded.

The Tobacco Officer reports that:—

> "There has been some improvement in the grading and handling of the crop during the past season, but brokers report that many consignments of Uganda leaf are still being shipped in too moist a condition.
>
> "The leaf generally is reported to be of excellent quality, and in spite of the high percentage of moisture in some of the consignments, Uganda wrapper leaf has sold at an average of approximately 1s. 3d. per lb.
>
> "Lack of suitable house-room for bulking, grading and packing is one of the greatest drawbacks to the successful handling of the crop on most estates, and it is far too common to see the leaf badly bulked in open sheds more or less exposed to the weather, and grading often being attempted in sheds in which it is almost too dark to see."

(*d*) So far, development of tobacco growing by natives has been mainly along the lines of supplying the demands of the local cigarette and tobacco factory at Jinja, but with the production of an increasing exportable surplus, it will be essential to maintain a high grade of exportable leaf and some form of control by Government of local marketing, and of the export of leaf, will become necessary.

Legislation along these lines is under consideration by the Government.

(*e*) Exports for the year, including both unmanufactured tobacco and cigarettes, amounted to 180,071 lbs., valued at £17,530, as compared with 144,367 lbs., valued at £10,949, in the previous year.

(*f*) During the year under review an Ordinance was enacted providing for an excise duty to be collected on all cigarettes and tobacco manufactured for sale in the Protectorate, the duty being 75 cents per lb. on cigarettes and 50 cents per lb. on tobacco. These duties are to operate from the 1st January, 1932.

Sugar.

12. (*a*) The production and manufacture of sugar in the Protectorate is still confined to the two sugar estates at Lugazi in Mengo district and Kakira in Busoga district.

The total acreage under cane in 1931 at these two estates was 8,440 acres, as against 6,700 acres in 1930.

The whole of the production of these estates has been consumed within the East African territories, a total of 44,995 cwts., valued at £46,576, being exported from Uganda in 1931, as compared with 6,669 cwts., valued at £8,719, in 1930.

(*b*) Pending the new quarantine station at Amani, the introduction and distribution of new varieties of sugar cane have been controlled as heretofore by the Mycologist. As far as possible distribution is being confined to varieties resistant to mosaic disease, and several resistant varieties have been raised at the Kampala Plantation of the department for distribution.

(*c*) The Excise Duties Ordinance mentioned under tobacco also applies to sugar, the duty being at the rate of Sh. 1 per cwt. on sugar, excluding jaggery, as from the 1st January, 1932.

(*a*) Tea.

13. Increasing interest in the cultivation of this crop is being shown by non-native planters, and the acreage on non-native estates increased from 360 acres in 1930 to 639 acres in 1931.

(*b*) Rubber.

As mentioned in the report for 1930, at present prices, production of rubber in Uganda is uneconomic, and the export of this product decreased from 627,000 lbs., valued at £16,814, in 1930 to 133,400 lbs., valued at £2,291, in 1931.

(*c*) Oil Seeds, Groundnuts and Simsim.

(1) The acreage under groundnuts increased from 96,544 acres in 1930 to 103,677 acres in 1931, but the exports decreased from 1,289 tons, valued at £15,123, in 1930 to 215 tons, valued at £2,076, in 1931.

On account of damage to certain food crops by the hairy chested locust, a large amount of this crop was used for food.

This locust did, in fact, destroy groundnuts, but whilst the early maturing bunch type of groundnut was readily attacked, the more extensively cultivated, longer maturing, spreading type of groundnut was left practically untouched.

In connection with "rosette" disease of groundnuts, which causes considerable loss in yield in certain areas, Dr. H. H. Storey, Plant Pathologist, East African Agricultural Research Station, Amani, visited the Protectorate during the year and made a tour of the main groundnut areas.

Dr. Storey submitted a valuable report on the position and put forward suggestions for experimental work on this disease. These suggested experiments are being incorporated in the experimental programme of the department.

Dr. Storey found that the incidence of the disease was most severe in the spacing trial plots of the department, which are scattered through the groundnut areas of Teso and Lango districts, whereas in native plots in the vicinity of these trial plots the disease was in many cases practically non-existent.

It would appear that in some way the native practices of not weeding the crop in its early stages and of mulching are inimical to the successful development of *Aphis leguminosæ*, the insect vector of the disease.

This is one of many illustrations slowly accumulating for the partial or complete justification for a native agricultural practice that does violence to western ideas.

The acreage under sim-sim remained approximately the same, but more was consumed in lieu of grain crops destroyed by locusts.

(2) A perusal of the figures of export of these products during the last decade will show that very little progress has been made in development of production, although in many areas both these crops are admirably suited for rotation with cotton.

Experiments are in progress to determine suitable economic rotations which include these crops and cotton, but it would appear that one of the major contributory causes to the non-expansion of these industries is the lack of suitable marketing arrangements, and it is hoped that before long it will be possible to increase the export of these products to a substantial degree by an alteration in the present marketing arrangements.

14. During the year attention has been given to the possibility of establishing additional money crops suitable for cultivation by natives.

(*a*) **Shea Nuts**—*Butyrospermum parkii.*

In certain areas in the drier parts of the Protectorate, this tree is indigenous and forms a valuable famine reserve with certain tribes.

As the dried fruits of this tree are used in Europe for the production of an edible oil, it was considered worth while organising the collection and shipment of a trial consignment of the dried kernels with a view to testing the economic possibilities of this produce.

Approximately eight tons were purchased from natives in the Amuria County of Teso district. The natives were paid a price of 3½ cents per lb. and although this first shipment contained a certian proportion of old "nuts" the consignment sold at the rate of £10 10s. per ton, and was reported upon as follows:—

(*1*) *Advance sample report.*—

"Quality fully fair average for Shea Nuts, while in test superior at:—

Oil	50·40%
Moisture	6·55%
Acidity	3·50%

This we consider highly satisfactory against West African Nuts which come around 45% Oil and we understand usually higher in free fatty acid."

(*2*) *Final Report.*—

"Shea nuts have been crushed and the quality is very satisfactory."

In addition, it was considered that this species might be of possible use in re-afforestation in the drier parts of the Protectorate and experimental plantings were made at the Serere Experimental Station, planting at stake and transplanting from nurseries being tried.

(*b*) **Oil Palm**—*Elæis guineensis.*

Following on a visit of Mr. F. M. Dyke, a representative of Messrs. Lever Bros., it was decided to make experimental plantings of oil palms with a view to testing their possibilities in the establishment of a local soap industry, and five acre blocks were established near Jinja and at the Serere Experimental Station.

Kernels from selected palms were obtained from Nigeria and successfully germinated at the Botanic Gardens, Entebbe.

(*c*) **Sunn Hemp**—*Crotalaria juncea.*

During the year, trial plantings, rettings and fibre extractions were made at Serere and Bukalasa, and samples of the fibre obtained were submitted to the Imperial Institute for report and valuation.

It was established that good yields of fibre can be obtained, but unless and until a method of fibre extraction can be found to displace the customary hand method, this crop is unlikely to become a paying one in Uganda.

(*d*) **Manilla Hemp**—*Musa textalis.*

It was considered that this crop might be capable of development as a peasant crop in areas such as the Lake Basin area and the islands of the Lake Victoria where plantains form the staple food of the natives, and an area at the Kampala Plantation was planted up with this crop.

Samples of fibre were prepared and forwarded to the Imperial Institute for valuation and report, but at the time of writing no report has been received.

(*e*) **Essential Oil Plants.**

Work on essential oil plants has been continued, and endeavours have been made to obtain an adequate supply of material from each species for test distillation purposes. Samples of oil obtained from both local and introduced species were forwarded to England for report and valuation.

Further details of work on essential oil plants will be found in the reports of the Agricultural Chemist and Plantation Manager, Kampala, in Part II. of this Report.

(*f*) **Tung Oil.**

Additional plantings of both *Aleurites fordii* and *Aleurites montana* were made during the year at Bukalasa and Serere.

(*g*) **Hydnocarpus spp.**

Trees of *Hydnocarpus wightiana* which were planted out in the early part of 1927 flowered and set fruit for the first time during the year. *Hydnocarpus anthelmintica*, plants of which were planted in 1929, have not, so far, produced any fruit.

Experimental Stations.

15. In addition to the Botanic Gardens, Entebbe, departmental stations are maintained at Bukalasa, Kampala, Serere and Bugusege, and reports on the work carried out at these stations will be found in Part II. of this Report.

In addition minor stations, financed out of Native Administration funds, are maintained at Ngetta, Kamuge and Wanyange in the Eastern Province.

Sir Arthur Hill, K.C.M.G., Director, Royal Botanic Gardens, Kew, during his visit to the Protectorate in January, 1931, reported favourably on the Botanic Gardens and submitted valuable suggestions for their re-organisation and these are being carried out gradually as finances permit.

Agricultural Education.

16. The Superintendent of Agricultural Education reports as follows:—

"*A.* Rural Science in Elementary Schools.

"The system under which rural science is included in the curricula of the elementary schools of the country and the steps that are taken by the Agricultural Department to make this teaching effective are described in detail in the Annual Report for 1930. This work has been continued and extended during 1931 and particulars of the work are described below.

"(*a*) *The Bukalasa Farm School.*—Two courses for elementary teachers were held during the year, each lasting approximately three months. An average of twenty-seven teachers attended each course. The subjects taught covered the syllabus for rural science in elementary schools and special attention was given to the working of a school garden.

"A short course for middle schoolmasters who have been trained at Makerere College was held from January 5th to February 7th. Fourteen students attended.

"From March 21st to August 9th departmental native instructors from Mubende district attended a course of instruction.

"(*b*) *The Serere Farm School.*—The first course for teachers from elementary schools and normal school pupils was held from August 17th to November 6th. Sixteen pupils attended.

"The subjects taught included lessons and demonstrations on agricultural practice (soil and cultivation, prevention of erosion, manuring, rotation of crops, weed control, seed selection and the correct method of cultivation of the commoner crops) together with simple lessons on the growth of the plant and on some of the commonly occurring plant pests. The pupils also took part in the practical operations on the farm.

"(*c*) *Inspections of Schools.*—Inspection of elementary and normal schools, from the point of view of the teaching of rural science and the organisation of school gardens, was carried out in nearly all districts at least once during the year.

"A marked improvement has been noticed at most schools where the teachers have been through a course at Bukalasa.

"*B.* Makerere College Courses in Agriculture.

"The third-year class consisted of five, and the second-year class of three, students; the first-year having been spent at Makerere continuing their general education. The courses of instruction have not been materially altered during the year and details will be found in the Annual Report on Agricultural Education for 1930. The five third-year pupils who completed their course at the end of the year are being engaged to work under the various officers of the Department.

"*C.* General.

"As in past years, the Honourable the Director of Education and members of his Department have given every assistance and have thus made co-operation easy."

Agricultural Statistics.

17. The usual statistical information will be found in the appendices at the end of Part I. of this Report.

18. As the majority of the officers of the Field Division of the Department are stationed in the Eastern Province, the report of the Senior Agricultural Officer is published in full and will be found on page 17 of this Report.

J. D. TOTHILL,

Director of Agriculture.

ANNUAL REPORT ON AGRICULTURE IN THE EASTERN PROVINCE.

Meteorology and Effect on Crops.

The total rainfall in most areas was about normal, being slightly under the average in the northern part of the province but above the average in the south. The early months were normally dry and hot. The rains broke at the usual time and the grain crop had excellent growing weather which should have resulted in a good yield had not other causes prevented it. It is usual for a dry period to occur in June or July, but except in Lango this was much less noticeable than usual and in some parts there was no real break in the rains. This weather was ideal for the early planted cotton and, in fact, the rainfall was so well distributed in June, July, and August as to produce an exceptional germination and a strong, growing condition in the later cotton as well. This evenly distributed rainfall extended into September. There was a long succession of cloudy days when warmth and sunshine were needed to induce flowering, and then in the central part of the province extreme drought conditions set it. The October rainfall at Serere was the lowest on record. The drought was not felt so much in Lango or in Busoga, but where it occurred the effect on the cotton crop was very bad. The rest of the year was normal, rain extending into the middle of December in Busoga, while the dry season set in as usual in the more northerly districts.

Locusts.

The locust infestation had such a disturbing effect on agriculture that it is necessary to describe it before passing on to individual crops.

A large increase in the size and number of swarms of locusts (*L. migratoriodes*) took place in the first two months of the year. The change of colour to bright-yellow in the male insect was noticed in February and copulation took place soon after. Early in March, swarms, instead of travelling long distances in one direction, would settle for longer periods, the direction of flight became aimless, until finally the swarm would settle and lay its eggs. The first egg laying occurred in areas bordering on lakes or swamps but later layings were made in any kind of soil whether covered by short grass, elephant grass or bush. Laying swarms were so numerous that hoppers hatched out from their eggs in every gombolola in the Eastern Province, while in some districts every muruka was a breeding ground. Native chiefs were instructed to report the position of each egg area. These varied from a few acres to several square miles in extent. The smaller patches were dealt with by digging up the eggs and ploughs were used where possible so that the egg masses could be exposed to the action of the weather. This was not very successful for many of the eggs hatched out.

Laying continued throughout March and April and successive bands of hoppers hatched out until the middle of May. Destructive measures were immediately organised and beating parties were able to deal successfully with the first hatches, much destruction being done to them while the hoppers were in the first, comparatively inactive, stage. A week later, when the largest hatch appeared, practically the whole population, men, women and children were organised for the work of locust destruction. At first it seemed that success would be achieved by beating, sweeping towards a centre and beating, sweeping into trenches, ring firing and fire trenching. Agricultural Officers were engaged with the Administration in organising this work and the native population did practically nothing else but locust destruction and emergency food planting for eight weeks. Of the earlier hopper bands only a few reached the marching stage. These bands when marching through the grain crop did not completely destroy the plant, and bulo when eaten in its young stages appeared to benefit by being eaten down, in that tillering was induced. It was thought, therefore, that the bulk of the crop would be saved. But later it was seen that hoppers which reached the vigorous stage when they were more than a month old were extremely destructive. In spite of continued efforts, so many bands had to be dealt with towards the end of May that although the whole country was stinking with dead hoppers there appeared to be just as many left. Further hopper bands began to march in from uninhabited, sleeping sickness, and forest areas to join those which had escaped destruction. Large bands began their marching movements destroying all bulo in their path. A hopper band at Serere, which came from the direction of Lake Kioga, where egg laying had been very prevalent, took a week to pass. They were kept off the plots by trenching for a few days but finally overran the farm destroying all the grain crops on it and eating down the grass.

The hoppers got their wings when 50—60 days old and after a few days' rest flew off and became even more destructive than before so that many of the remaining plots of grain crops were destroyed just before harvest.

Except in two counties of Lango and two counties of Teso districts the bulo crop was completely destroyed. In large areas of Bugwere, Budama and Busoga destruction was very severe. Whereas in the southern part of the province plantains are either the chief food crop or else are of considerable importance, the northern districts are populated by grain eating peoples, whose staple diet was destroyed. It was also found that locusts would eat pigeon pea (*Cajanus*), which is an important crop in Lango, and the bunch type of groundnut.

It therefore became very important to see that planting of food crops was carried out in order to avert the disaster of a famine, and while the people were encouraged to plant more sim-sim and groundnuts (of the spreading type) the main food crops had to be sweet potatoes and cassava. Great efforts were made in this direction and the acreage of sweet potatoes was increased by 86,000 acres to 231,700 acres. After the 1928-29 famine large areas of cassava had been planted every year as a reserve against food shortage and most of it had remained untouched. 204,272 acres of new plantings of cassava were made so that there was a large supply of food, which should be sufficient to keep the people going until another grain crop can be harvested in 1932.

A second breeding of locusts took place in October and November. Hatches of hoppers were reported from all districts but they were not so numerous or so vigorous as those of the first breeding. Many of the hoppers died when the dry weather set in. Hopper bands were dealt with by burning the grass and where this was not sufficient beating parties finished them off. In this way complete control was obtained and the position at the end of the year was hopeful.

The Efficacy of Control Measures.

The efforts of the native population, when men, women, and children turned out day after day to fight locusts, deserve the greatest praise. It is evident, however, that such efforts, even when organised as they were, by all the Administrative and Agricultural Officers available, are of no avail when the locust infestation is on such a scale as after the first breeding. In the event of another infestation on the same scale the writer is of opinion that the native population would be better advised to concentrate on the planting of crops which are not attacked by locusts so that food supplies would be assured.

Cotton.

Marketing of the 1930-31 Crop.—The expectations of a good crop mentioned in the last Annual Report were fully realised. Lango and Teso districts had the highest sales yet recorded and the total for the province was 65,641 tons, equivalent to 110,157 bales, or 57% of the Protectorate crop.

The following table gives statistics relative to the 1930-1931 season.

District.	*Acreage.*	*Sales in Tons.*	*Yield per acre. lbs.*
Busoga	132,890 ...	20,085 ...	345·5
Budama	31,816 ...	3,561 ...	244·4
Bugwere	107,484 ...	11,099 ...	222·1
Bugishu	26,793 ...	2,305 ...	176·3
Teso	118,813 ...	17,429 ...	329·5
Lango	66,757 ...	11,162 ...	360·5
TOTAL ...	484,553 ...	65,641	Mean 323·3

The cotton buying season opened on January 19th in all districts except Busoga. The prices paid at first were very low, the average for the first two weeks being seven shillings per 100 lbs. All natives being short of money and having a large crop to dispose of, a large quantity of cotton was sold at that price. The price then began to rise. The Busoga season opened on February 2nd, paying eight to ten shillings and the price continued to rise in all districts until twelve shillings or more were being paid per 100 lbs. Thus, while the northern areas sold the bulk of their crop at a low price, growers in Busoga met a much better market.

There were no big combinations of ginning firms into buying associations, but certain European firms came to agreements as to price and competition. The use of lorries for transporting cotton to markets and ginneries before sale was not much in evidence at first, owing to the uncertainty as to the application of the new Highways Ordinance but towards the end of the season this method of marketing was used to a great extent owing to the keenness to buy cotton on a rising market.

1931-1932 Crop.—It was at first thought that the cotton acreage would be reduced because of the time spent in fighting locusts and in planting emergency food plots, but although there was some reduction in the districts worst affected, the total for the province was in excess of the previous year.

District.	*Acreage. 1931-1932.*	*Acreage. 1930-1931.*
Busoga	137,887 ...	132,890
Budama	37,301 ...	31,816
Bugwere	114,852 ...	107,484
Bugishu	47,592 ...	26,793
Teso	115,626 ...	118,813
*Lango	52,483 ...	66,757
TOTAL ...	505,741 ...	484,553

*The Lango figures are calculated by the new method for the first time and are not comparable with those of the previous year.

PERCENTAGE MONTHLY COTTON PLANTING.

District.	*May.*	*June.*	*July.*	*August.*	*September.*
Busoga	0·2	10·9	47·3	32·4	9·1
Budama	0·0	13·9	50·9	25·3	9·9
Bugwere	2·8	26·2	45·2	23·4	2·4
Bugishu	0·0	12·9	55·2	31·0	0·9
Teso	6·0	27·7	44·8	20·0	1·5
Lango	0·2	11·6	62·8	25·4	0·0

The percentage monthly plantings for the whole province are given below:—

	1931-1932.	*1930-1931.*	*1929-1930.*
	%	%	%
May	2·1	1·7	2
June	18·1	13·5	13
July	49·2	28·4	37
August	26·3	46·9	33
September	4·3	9·5	15

In normal years the cotton crop can be divided roughly into two groups. The earlier plots are generally planted in new clearings. The later cotton is grown on the old bulo plots after the grain harvest. This arrangement was upset by the destruction caused by locusts to the bulo plots during May, June, and July. Many natives took the opportunity of putting in their cotton after the bulo had been eaten off, and this effect is well shown in the above tables. By the end of July, 69·4% of the cotton had been planted, as compared with the 43·6% of the previous year. Rains were unusually well distributed during the planting season but unfortunately rainy and sunless weather continued too long. Thus while the early appearance of the crop was exceptionally promising, flowering was not as good as it shonld have been. Then the unusually dry weather of October had a very bad effect on the crop in Teso district and in that district and in Lango the crop will be below the average in yield. The indications are, however, that the Busoga and Budama cotton will yield better than usual so that the total crop for the province should be about normal.

Distribution of S.G. 29 Cotton.—The Kadunguru area gave an average crop from the S.G. 29 seed planted there in 1930, and 310 tons of S.G. 29 seed were obtained from cotton bought at Kadunguru ginnery. This was sent to the 50,000 acre stage comprising Serere, Kasilo, and Ngora counties of Teso district.

The Agricultural Officer, Mr. H. L. G. Milne, who was in charge of Mulondo during the absence of the Assistant Cotton Botanist, states in his report with reference to the Mulondo Segregated Area: "This crop yielded 246,213 lbs., or 109 tons, of seed cotton, of which only some 2,000 lbs. were kafifi grade. The seed yield was approximately 71 tons. With the exception of five tons for replanting the area all of this seed, 66 tons, was transported to the Uganda Cotton Buying and Ginning Company's ginnery at Mukura for distribution in the Mukura—Kapiri 7,000 acre area." The latter had very unfavourable weather conditions. Heavy rains resulted in the land being waterlogged and many plots being flooded in August. The prospects of picking a good crop were not very bright so that marked gunny bags were distributed along the border of the area in order that any cotton going to other ginneries than Mukura might be traced and used to augment the seed supply if necessary. This seed is destined for 50,000 acres in Kumi and Bukedea counties in 1932.

North Teso is also to be planted with S.G. 29 in 1932, using seed from the Kadunguru area which promises to produce an average quantity of cotton.

Coffee.

Marketing of 1930-31 Bugishu Crop.—The total crop amounted to 260 tons of parchment coffee, compared with 103 tons of the previous year. In view of the projected organisation of the coffee industry in Bugishu the Native Administration entered the market, sending out buyers and paying a flat rate of 25 cents per lb. for parchment coffee. In actual fact the bulk of the crop was purchased by other buyers at a rather higher figure which was made possible by a rising market. The quality was about as usual but that there is room for improvement can be inferred from the report of the Agricultural Officer, Mr. A. J. Kerr, who writes: "Owing to the fact that the coffee thus bought was native prepared, great variations in quality due to differences in fermentation period, washing, and drying occurred. Competitive buying destroyed what chance there was of various grades being kept separate, so that a mixed sample resulted. Most of the coffee was insufficiently dried." It is precisely because of this state of affairs that it is necessary to take measures to turn out a grade of coffee equal to the high standard of which Bugishu coffee is potentially capable. It has become obvious that this can be done only by controlling the treatment coffee receives, from the cherry until it is exported after curing and grading. The Native Administration has therefore proceeded with the erection of a coffee factory at Bubulu containing hulling and grading machinery, and four buying stations fitted with pulping machinery.

Coffee Factories.

The following extract is made from the Agricultural Officer's report:—"It was decided to erect central pulping stations at four centres, Bubulu, Makuyu, Bulucheke, and Simu, where the coffee would be bought in the cherry, pulped, fermented and washed in bulk, after which each lot would be sun-dried to a certain extent before being taken to the factory at Bubulu,

where it would be completely dried in an artificial drier, then hulled and graded. During 1931 progress was made with the building of the factory at Bubulu. The factory itself with an engine driving a pulper, pump, huller and grader, was in working order by the end of the year, and the fermenting and washing tanks were ready, but the full scheme for buying and pulping cherry could not be put into working, as neither the sun-drying barbecues nor the artificial drying floor were ready.

The central pulping stations at Bulucheke and Makuyu were built, containing hand pulpers and washing and fermenting tanks, but the barbecues could not be completed so no cherry was bought."

Marketing the 1931 Crop.

Owing to the various delays in building operations it was not possible to put the scheme for buying cherry into full operation but "as a temporary arrangement, parchment coffee was bought by the Native Administration's buyers at the main centres, *viz.*, Makuyu, Bulucheke, Bubulu, Buwalasi, and later on Simu and Buluganya for the coffee from the high areas in North Bugishu. Badly prepared coffee was turned away and samples were bulked together as far as possible to give uniformity." The Native Administration bought 80 tons of parchment. This was taken to Bubulu and properly dried on small drying trays after which it was hulled and graded. Several bulk samples have been sold to various firms with a view to testing marketing channels for the next crop.

Other buyers operated in the usual way paying prices similar to those of the 1930-31 season. The total crop is again estimated at 260 tons.

Distribution of Coffee Seedlings.

Allowing for 5% of failures, 403,686 young coffee trees were planted during the year after they had been issued from the Departmental nurseries direct to natives. Although this number was nearly double the issue of the previous year the demand was much greater than the supply and some applicants had to be content with only twenty trees.

The system of nursery work has now been changed so that the Department maintains nurseries in which seedlings are grown from good seed, and the Lukiko maintains receiving beds into which the seedlings are transplanted, in the cotyledon stage, according to the requirements of each gombolola. These requirements have been calculated at 100 trees per taxpayer. There are 660,000 seedlings growing in Lukiko nurseries, another 400,000 are ready for transplanting. There will thus be over a million trees for distribution in 1932

The acreage of coffee is now as follows:—

	Acres.
North Bugishu	929
South Bugishu	981
Central Bugishu	124
TOTAL	2,034

Pruning.

The coffee has made an excellent recovery from the dieback noted in the last Annual Report. Trees at the lower altitudes were allowed to grow on instead of being topped, and this combined with the increased use of banana fibre as a mulch has resulted in healthy new growth being made. The single-stem pruning system has been abandoned and a different system will be brought in when the Bugusege pruning experiments become advanced enough to give conclusive results. In the meantime all new seedlings are topped in the nurseries before being issued, so as to produce two stems.

Coffee Pests and Diseases.

The Agricultural Officer writes as follows:—

"*Stephanoderes.*—During August a severe attack of Stephanoderes made its appearance especially in the lower areas along the rivers Manafwa and Siroko. A large proportion of the crop from these areas was spoiled. Attempts are being made to control the pest by introduction of parasites and by cultural operations, but it is thought that the use of the artificial drier at the coffee factory will prove a help in this matter.

Stem Borer.—Arthores has been on the increase in small localities scattered over the district, and is being dealt with by stumping and burning infected trees.

Antestia.—Is present in Bugishu, but has shown no signs of increase and little damage has been done.

Scale Insects.—Coffee at high altitudes in North Bugishu is singularly free from pests or diseases, but scale insects are present to a small extent.

Ceratitis.—Fairly widespread and though it did not do much damage, made clean pulping more difficult.

Hemileia vastatrix.—Became apparent to a small extent on trees towards the end of the crop, but the trees soon recovered.

Cercospora.—Damage was negligible."

Experimental Work at Bugusege Plantation.

New land was cleared for the planting of the new green manuring experiment, the shade experiment and the spacing experiment and planting will shortly be completed.

In the plantation pruning experiment the Agobiada system has increased its lead over the single-stem and multiple-stem systems and has given a heavy crop without any sign of overbearing. The old green manuring experiment which tests various methods of covering the soil with green manures, banana mulch and weed cover has not yet shown any considerable differences in yield. An experiment to test a modified form of the multiple-stem system of pruning designed for the use of natives is not yet in bearing.

These experiments will be more fully reported on in Part II of the Annual Report.

Oil Seeds.

Groundnuts and Sim-sim.—The cultivation of these crops was encouraged as a substitute for the bulo which was destroyed by locusts. The acreage of sim-sim was increased by 37%, the biggest increase being in Teso. There was a corresponding decrease, in the latter district, in the acreage of groundnuts planted and this is difficult to explain unless it was due to a belief that groundnuts would be eaten by locusts. It was found that locusts would destroy the bunch type of groundnut and severe loss occurred in Busoga and to a certain extent in Lango. But locusts were found not to do very serious damage to the spreading groundnut which is in general cultivation in Teso and Bugwere. The latter district showed a considerable increase in groundnut acreage which compensated for the decline in Teso. The total for the province was 63,513 acres, which is about normal for groundnuts. The sim-sim acreage was 107,972 acres, of which 59,730 acres were grown in Lango. The groundnut crop was fair but the sim-sim yielded very poorly owing to the attacks of the gall fly and mildew and in parts it failed completely.

No organisation of markets was undertaken this year owing to the necessity of keeping as much food as possible in the country. Further the price of oil seeds at home was for a time too low to yield a profit to the cultivator in Uganda. Towards the end of the year prices rose but little business was done for export, no doubt owing to the general feeling of uncertainty in business cricles.

The following table summarises the bookings of oil seeds at railway stations and ports:—

	Groundnuts. Tons.	*Simsim. Tons.*
Bugwere	53	21
Teso	342	211
Lango	½	326
TOTAL ...	395½	558

The destination of this produce was not definitely known but it is understood that soap factories in Mombasa were the chief buyers.

Shea Butter Nuts.—In order that an experimental consignment of shea nuts might be sent home a quantity of this produce was purchased from natives in Teso district. This was not done until the fruiting season was over, and many of the nuts had been lying on the ground for some time, so that it was not expected that a very high standard would be reached. However, the analysis was distinctly favourable when compared with West African nuts, the oil content being 50·4%, moisture 6·55%, and free fatty acid 3·56%. It is probable that the quality would be improved in another year by buying earlier.

The amount sold after picking over and drying was approximately 8¼ tons which obtained £10 10s. per ton in Belgium when the Liverpool Produce Association's quotation was £9 to £9 10s. As an experimental price 3½ cents per lb. was paid to the native, but the home price would have to be considerably higher than those quoted if an export trade in shea nuts is to be developed.

Ploughing.

Efforts to popularise the use of ploughs were chiefly made in Busoga and Lango districts and to a less extent in Budama. Teso and Bugwere remained the chief ploughing areas as is shown by the following figures:—

Teso District.	*No. of Ploughs.*
Napak	405
Usuku	650
Amuria	1,079
Soroti	960
Serere	527
Kasilo	246
Kumi	2,448
Ngora	1,534
TOTAL ...	7,849

Bugwere District.	*No. of Ploughs.*
Mbale	42
Bugwere	47
Pallisa	871
Bukedea	1,690
TOTAL ...	2,650

The increase of 1,426 ploughs in Teso is the more satisfactory in that it shows that ploughing is becoming more popular in Amuria and Serere counties where it had not been so prevalent as in Kumi. In the latter county there is nearly one plough to every five taxpayers.

The method at first adopted relied on the training of men and cattle at large ploughing schools. This system has its disadvantages in that cattle may have to be brought in from long distances and men have to leave their homes, both of which are unpopular. Staff being available better results may be obtained at smaller ploughing schools when they can be established at gombolola headquarters, and by training cattle actually at the home of the owner. This system needs a number of capable native instructors who have to be trained at the ploughing schools.

The Ploughing Instructor was stationed in Busoga for the greater part of the year and carried out training work at five centres in North Busoga. Finally five native Ploughing Instructors were trained and appointed to counties in which their work will be to train cattle for any owners who wish to take up ploughing. As a result of a large number of cattle being trained at the ploughing schools many gombolola and muruka chiefs bought ploughs. The Agricultural Officer for Busoga writes: "The desire for ploughs and trained cattle has increased to the extent that there are now 76 ploughs in the district. Given money to buy ploughs the progress maintained should be increased. One gombolola chief owned two ploughs and one cultivator and mainly by this means was able to plant nearly 100 acres of cotton." There is some evidence that the chiefs are becoming interested in ploughing. It has to be admitted, however, that progress among the peasantry is rather slow and there has so far been little response to the offer of assistance by the county instructors.

In Lango training was carried out as follows:—

		Men.		*Cattle.*
(*a*) Ploughing Schools:	Ngetta	62	...	382
	Awelo	59	...	111
	Kalaki	114	...	215
		235		708
(*b*) Prison Shamba	... ...	190	...	—
(*c*) Privately	... ...	20	...	100
	TOTAL	445	...	808

The training of prisoners in the gaols is a new departure. Six prisoners were trained as ploughmen at Ngetta and they afterwards acted as instructors on the prison shamba using ploughs and cattle from Ngetta. In this way assistance was given in cultivating a large prison shamba and the prisoners were taught something which may be of use to them later.

The following extract is taken from the report of the Agricultural Officer, Mr. R. P. Davidson:—

"Ploughing is gradually becoming more popular in Lango but the great obstacle to progress is lack of money. This is being got over to a small extent by re-selling on credit to suitable natives, ploughs bought by Native Administration funds. Eleven were issued in this way during the year. A few ploughs were bought for cattle in Kalaki saza but the low prices of cattle during the last few months has put a temporary stop to this trade.

"Government ploughs were issued to peasants having trained teams belonging to themselves or their families and who are themselves efficient ploughmen. In most cases these men have done fairly satisfactory work on their own and their friends' shambas. The men will be expected to buy ploughs of their own in the course of a year or two but, even if they are unable to do so, the requests for ploughs which have been received from the areas where these men are working show that it is well worth while to give out ploughs in this way.

"The experiment was tried of giving a fundi a plough and a team of Lukiko cattle and sending him out to plough shambas for people who had expressed their willingness to pay for the work. It was not a success as the man did not look after the cattle properly and his ploughing was poor. Most of the cattle in Lango are owned by chiefs or the older peasants and it is not easy to find young able bodied men with a team of cattle. A few ploughs were bought privately during the year, mostly by chiefs. An arrangement was made with the agents whereby approved men were allowed to pay for their ploughs in two instalments.

"It was found that a good number of ploughs were lying idle in various parts of the district, and efforts were made to get these into regular use. Many only required some simple repairs, and others were not being used because their owners had not a

full team of cattle. The latter was the case in Kalaki saza where there were 100 ploughs, only 31 of which were in use, rinderpest having caused the death of many cattle in that area a year or two previously. "There were only 146 ploughing cattle in the saza, but a further 215 were trained during the last three months of the year. Endeavours were made to get the plough owners who were without cattle to co-operate with their friends who had sent their cattle to the ploughing school.

"The following table gives the numbers of ploughs in use in the district in 1930 and 1931:—

Saza.	*1930.*	*1931.*
Atura	2 ...	2
Dokolo	9 ...	14
Eruti	6 ...	22
Kaberamaido	12 ...	15
Kalaki	31 ...	73
Koli	4 ..	9
Kwania	1 ...	14
Maruzi	— ...	2
Moroto	3 ...	5
TOTAL	68 ...	156

This shows an increase of 88, which includes the 25 Lukiko and Government ploughs. The remaining 63 are made up of ploughs privately purchased during the year and ploughs formerly lying idle."

The Tororo Ploughing School in Budama district was begun at the instance of the District Commissioner and 9 boys and 27 cattle were trained there by the Ploughing Instructor at the end of the year. He reports that "a higher standard of work was reached here than at any other centre, more 'harmony' existing between men and teams." The owners of the trained oxen were each lent a plough for six months, after which time they will be expected to buy their own.

Stumping and Clearing.

At the end of 1930 there were clearings of 100 acres or 200 acres at seven sites in the province and the cropping of them was given in the Annual Report. No funds were given for payment of the ploughmen on these blocks in 1931 so that they had to be cultivated in the ordinary way by those natives who wished to do so. No great enthusiasm was shown by the people with the possible exception of those at the Kamuge block in Bugwere district. The three clearings in Lango were ploughed, the Native Administration bearing the cost, in view of the efforts being made to encourage ploughing in the district. Even so, natives at Awelo were unwilling to make use of the land. On the other hand, at Aduku and Ngetta the clearings were divided up into three sub-blocks which were farmed according to the advice of the Agricultural Officer, who reports that "the natives are beginning to take an interest in the scheme and the prospects for its ultimate success are quite good at these places."

Experimental Work.

A. Experimental Farms.

It has been possible owing to the financial assistance given by the Busoga Lukiko to open a new experimental farm. There is now such a farm, under the control of the Agricultural Officer, in each district with the exception of Teso. Here a valuable grant from the Native Administration has been used on outside experiments at several centres. With the probable increase in the importance of groundnuts it is hoped to open a new farm within the groundnut area of this district. An outline of the work going on is given below.

Serere Experiment Station.—No changes were made in the general organisation of work at the station. On the Experiment Farm, the groundnut, sim-sim and cotton experiments followed the same lines as in the previous year except that more attention was paid to the seed rate of cotton, and a ratooning experiment was completed. Locusts destroyed all the bunch groundnut experiments but they were successful in the second sowing. The maize and bulo on the Seed Farm were destroyed and seed stocks of improved varieties thus reduced. Interesting results were obtained in recording the costings of groundnuts under different methods of cultivation. Sunn hemp retting trials were conducted for the first time. A new block of five acres was planted with oil palm. 30 acres S.G. 29 cotton were grown to provide seed for the Mulondo Segregated Area, the latter now being planted up with Serere seed every year.

The Serere Agricultural School held its first session and this is reported on elsewhere.

Ngetta Farm.—The experimental work included cotton sowing date and spacing, groundnut spacing and broadcasting trials, and seed rate trials with sim-sim. Other valuable work with maize, sorghum, bulo, and cajanus, was destroyed by locusts. Cost accounts were kept of cotton, groundnuts, sweet potatoes and the other important crops. A considerable quantity of good seed was issued for distribution through the district increase plots.

Kamuge.—The rotation demonstration was continued. A new piece of land was opened for monthly plantings of cassava of two varieties having different growing periods with a view to obtaining information as to the yield of this important famine reserve crop at different times of the year.

Bubulu.—The area under coffee is being kept up for demonstration of pruning and cultivation methods. The rotation trials were continued. Cover crops for use in Bugishu were under observation.

Wanyange.—This is the experimental farm for Busoga referred to above. It is situated in forest land close to Lake Victoria, six miles from Jinja. Clearing operations resulted in 14 acres being ready by the end of the year. In addition to this area five acres were partly cleared and planted with oil palm.

Bugusege Experimental Plantation.—The work going on at this plantation has been described under "Coffee."

B. District Experimental Work.

Cotton Experiments.—The fifty quarter-acre comparison plots scattered over the province were used to test for the second time the new strain S.G. 29 against N. 17, which has been the cotton in cultivation. Cotton variety trials conducted at eight centres other than Serere will be reported on by the Cotton Botanist. Cotton spacing trials were conducted in two places in Busoga.

Groundnut Experiments.—These were repeated in Usuku as in the previous year, the object being to confirm the results of trials at Serere with regard to cultivation methods, and the comparative merits of the bunch and spreading types of groundnut. Unfortunately, these experiments were spoilt by locusts and by *rosette* disease. A number of selections of plants resistant to the latter were made for trial next year.

Rotation Experiments.—The trial plots of the standard rotation were continued at a number of centres in Teso and Lango and at experimental farms elsewhere. Sowing date strips of crops sown at intervals from March to September at two centres in Teso refer to the rotation of crops. And the second pair of the quarter-acre comparisons were planted with groundnuts and sim-sim in the autumn rains in order to find out in what areas late planting of these crops would agree with the proposed rotation.

Usuku Experiments.—Experiments designed for the special conditions of the Usuku soil were laid down at Katakwe and Toroma:

(*a*) Mound cultivation. Cotton was planted on very large mounds or beds. These are to be cropped in the ordinary way but the mounds will be split back after some years cultivation, thus exposing fresh soil.

(*b*) Breakpan experiment. This consists of growing pigeon pea (*Cajanus*) before the cotton so that the deep roots of the former may break the pan which tends to form under Usuku soils.

A detailed account of all experimental work carried out, with results and conclusions drawn from them will be found in Part II. of the Departmental Report.

Pests and Diseases.

On the cotton crop Blackarm occurred freely after the usual heavy infection with Angular Leaf Spot. It did not reach its virulent stage and appeared to be doing little damage. Jassids were not so much in evidence as during the previous cotton season. *Lygus vosseleri*, however, was very prevalent except in Busoga, the leaves being riddled with holes due to this pest. It seems likely that Lygus and unfavourable weather were responsible for the low flowering and high boll shedding which resulted in the low yield of the crop in Teso and Lango. *Helopeltis bergrothi*, and the Spiny boll worm caused damage in small areas.

On sim-sim the gall fly caused a great deal of damage and this crop yielded poorly in consequence. Other pests were not serious. The large hawk moth caterpillar at one time looked like spoiling the sweet potato crop which would have been particulary disastrous in that the population were relying on it to replace their bulo which had been destroyed by locusts. A few serious outbreaks of this caterpillar occurred but they rapidly became diseased and died off.

Dr. H. H. Storey, Plant Pathologist of the East African Agricultural Research Station, Amani, visited the groundnut growing areas of the Eastern Province and gave valuable assistance in framing a programme for investigating means of combating *rosette* disease in groundnuts.

Miscellaneous.

Minor crops, such as maize, rice and mtama (sorghum), all suffered from the attacks of locusts though it was noticeable that the latter was the least affected. The Bugishu returns show that 109 acres of wheat were grown at the higher altitudes, and a small number of chillie plots were grown in Busoga.

C. E. J. BIGGS,
Senior Agricultural Officer.

APPENDIX No. 1.

IMPERIAL INSTITUTE,
LONDON, S.W.7,
7TH DECEMBER, 1931.

REPORT ON *OCIMUM MENTHAEFOLIUM* OIL FROM UGANDA.

The sample of oil which is the subject of this report was forwarded to the Imperial Institute by the Director of Agriculture, and is referred to in his letter No. 1626/350 of the 16th July, 1931.

The sample was stated to have been distilled from indigenous plants, and it was desired to ascertain how the oil compared with products already established on the market.

DESCRIPTION.

The sample consisted of 18 cc. of an almost colourless, mobile oil.

RESULTS OF EXAMINATION.

The oil was examined with the following results, which are shown in comparison with corresponding figures recorded by Rovesti* for a sample of the oil of *Ocimum menthaefolium* :—

	Present Sample.	*Recorded figures.*
Specific Gravity	0·9122 at 15·5/15·5°C ...	0·9496 at 25°C
Optical Rotation aD	+13·51° at 16°C ...	+1°24′ at 22°C
Refractive Index nD	1·4763 at 20°C ...	1·5165 at 24°C

It will be observed that the physical constants of the present oil differ considerably from those of the sample of oil examined by Rovesti, which was distilled from plants occurring in Eritrea. According to this investigator the odour of the oil examined by him was reminiscent of sweet basil oil, and the oil consisted largely of methyl chavicol and anethole. The odour of the present oil, however, differs greatly from that of sweet basil oil ; it is more camphoraceous and does not indicate the presence of appreciable amounts of the above-named compounds.

REMARKS.

This oil might realise a low price as a cheap soap perfume, but its odour is not attractive and its production in Uganda is not likely to be remunerative.

IMPERIAL INSTITUTE,
LONDON, S.W.7,
7TH DECEMBER, 1931.

REPORT ON MUJAJA OMUNENE (*OCIMUM SP.*) OIL FROM UGANDA.

The sample of oil which is the subject of this report was forwarded to the Imperial Institute by the Director of Agriculture, and is referred to in his letter No. 1626/350 of the 16th July, 1931.

The sample was stated to have been distilled from indigenous plants, and it was desired to ascertain how the oil compared with products already established on the market.

DESCRIPTION.

The sample consisted of 20 cc. of a pale brown, mobile oil.

RESULTS OF EXAMINATION.

The oil was examined with the following results :—

Specific Gravity at 15·5/15·5°C	0·9117
Optical Rotation aD	−20·21° at 16°C
Refractive Index nD20°C	1·5048
Phenols (by absorption)	24 per cent.

The odour of this oil clearly indicated the presence of eugenol, and the phenolic portion of the oil consists apparently entirely of this compound. Eugenol is a constituent of several species of *Ocimum* : thus, a sample of *O. gratissimum* oil from the Seychelles was found at the Imperial Institute to contain 55 per cent. of eugenol, and the oil of *O. minimum* has been shown to contain 14 per cent.

Judging from its odour the non-phenolic portion of the present oil would appear to consist principally of terpenes and would thus be of little or no commercial value.

REMARKS.

This oil does not contain sufficient eugenol to render it of commercial value as a source of this constituent, and it hardly seems likely, even if the plant were extremely abundant and furnished a fairly good yield of oil, that it would prove profitable to distil it in Uganda for export.

*Annali di Chim. Applic., 1927, 17, 564.

Imperial Institute,
London, S.W.7,
7th December, 1931.

REPORT ON KAWAMALA *(COLEUS SP.)* OIL FROM UGANDA.

The sample of oil which is the subject of this report was forwarded to the Imperial Institute by the Director of Agriculture, and is referred to in his letter No. 1626/350 of the 16th July, 1931.

The sample was stated to have been distilled from indigenous plants, and it was desired to ascertain how the oil compared with products already established on the market.

Description.

The sample consisted of 10 cc. of a pale yellow, mobile oil.

Results of Examination.

The oil was examined with the following results :—

Specific Gravity at 15·5/15·5°C	0·8859
Optical Rotation aD	+43·0° at 16°C
Refractive Index nD20°C	1·4828

This oil does not appear to have been examined previously. Its odour, though rather pleasant is not strong or very distinctive. Judging from the odour and the physical constants the oil would appear to consist mostly of terpenes, and is unlikely to be of commercial interest.

Imperial Institute,
London, S.W.7,
7th December, 1931.

REPORT ON KAMYNYE *(HOSLUNDIA OPPOSITA)* OIL FROM UGANDA.

The sample of oil which is the subject of this report was forwarded to the Imperial Institute by the Director of Agriculture, and is referred to in his letter No. 1626/350 of the 16th July, 1931.

The sample was stated to have been distilled from indigenous plants, and it was desired to ascertain how the oil compared with products already established on the market.

Description.

The sample consisted of 10 cc. of a pale yellow, rather viscous oil.

Results of Examination.

The oil was examined with the following results :—

Specific Gravity at 15·5/15·5°C	0·9278
Optical Rotation aD	−11·96° at 17°C
Refractive Index nD20°C	1·5130

No reference to any previous examination of this oil can be traced. Apparently the oil is composed largely of sesquiterpenes and sesquiterpene alcohols. It has a rather pleasant persistent odour somewhat recalling that of vanillin.

Commercial Value.

The oil was submitted to a firm of essential oil distillers in London who confirmed the view that it consisted largely of constituents of the sesquiterpene class. They considered that it might find a limited application in perfumery as a fixative, but that there would not be much probability of any large consumption.

It seems unlikely that the oil would realise a price sufficient to render its production remunerative.

IMPERIAL INSTITUTE,
LONDON, S.W.7,
7TH DECEMBER, 1931.

REPORT ON GERANIUM *(PELARGONIUM CAPITATUM)* OIL FROM UGANDA.

The sample of oil which is the subject of this report was forwarded to the Imperial Institute by the Director of Agriculture, and is referred to in his letter No. 1626/350 of the 16th July, 1931.

DESCRIPTION.

The sample consisted of 14 cc. of a pale yellow, mobile oil.

RESULTS OF EXAMINATION.

The oil was examined with the following results, which are shown in comparison with the corresponding figures recorded for commercial Algerian and Bourbon geranium oils :—

	Present sample	*Recorded figures for commercial oils.*	
		Algerian	*Bourbon*
Specific Gravity at 15·5/15·5°C	0·8956	0·892 to 0·904	0·888 to 0·896
Optical Rotation aD ...	—16·29 at 18°C	—6·5 to —12°	—7·7 to —13·8°
Refractive Index nD20° C ...	1·4719	1·464 to 1·472	1·461 to 1·468

The oil possessed an odour which was decidedly pleasant but lacked the more pronounced geraniol odour of the commercial oils. It will be observed that its optical rotation is outside the range recorded for the latter oils, and in this respect it more resembles a sample of geranium oil from Kenya examined at the Imperial Institute, which had an optical rotation of —18·47°. The physical constants of a geranium oil, however, afford little indication of its commercial value.

COMMERCIAL VALUE.

The oil was submitted to a firm of essential oil distillers in London, who described it as distinctly different in character from the usual Bourbon or African oils as it apparently contains citronellal and iso-pulegol as well as geraniol and citronellol. In their opinion the oil is not likely to command so high a price as the true geranium oils.

The present values of commercial geranium oils in London are :—Bourbon, 16s. 4d. to 16s. 6d. per lb.; Algerian, 17s. 6d. per lb.

IMPERIAL INSTITUTE,
LONDON, S.W.7,
7TH DECEMBER, 1931.

REPORT ON LEMON-GRASS *(CYMBOPOGON CITRATUS)* OIL FROM UGANDA.

The sample of oil which is the subject of this report was forwarded to the Imperial Institute by the Director of Agriculture, and is referred to in his letter No. 1626/350 of the 16th July, 1931.

DESCRIPTION.

The sample consisted of 13 cc. of a pale yellow, mobile oil.

RESULTS OF EXAMINATION.

The oil was examined with the following results, which are shown in comparison with the corresponding figures recorded by Gildemeister for *Cymbopogon citratus* oil :—

	Present sample.	*Recorded figures.*
Specific Gravity	0·9178 at 15·5/15·5°C	0·870 to 0·912
Optical Rotation aD	+1·43° at 20°C	—1° to +0°12′
Refractive Index	1·4913 at 20°C	1·482 to 1·489
Citral (by the normal sulphite method) ...	72 per cent.	53 to 83 per cent.

The physical constants of this oil are slightly higher than those usually found for West African lemon-grass oil, which is also derived from *C. citratus*. The sample is, however, of good quality and contains a fairly high percentage of citral.

COMMERCIAL VALUE.

The current price of lemon-grass oil in London is 1s. 10½d. per lb., and consignments of the present oil from Uganda should realise a similar price under existing market conditions.

IMPERIAL INSTITUTE,
LONDON, S.W.7,
7TH DECEMBER, 1931.

REPORT ON PATCHOULI OIL FROM UGANDA.

The sample of oil which is the subject of this report was forwarded to the Imperial Institute by the Director of Agriculture, and is referred to in his letter No. 1626/350 of the 16th July, 1931.

DESCRIPTION.

The sample consisted of 19 cc. of a yellow, fairly mobile oil.

RESULTS OF EXAMINATION.

The oil was examined with the following results, which are shown in comparison with the corresponding figures recorded for Singapore and Java patchouli oils :—

	Present sample	*Figures recorded for oils from*	
		Singapore.	*Java.*
Specific Gravity at 15·5/15·5°C	0·9443	0·960 to 0·985	0·925 to 0·935
Optical Rotation aD	−12·6° at 20°C	−45° to −65°	+3° to −33°
Refractive Index nD 20°C	1·5048	1·5080 to 1·5120	1·5000 to 1·5080
Solubility in 90 per cent. alcohol at 15·5°C ...	Slightly turbid with 7 vols., not entirely soluble in 10 vols.	Soluble in 3 to 10 vols.	Soluble in up to 10 vols.

It will be seen that the physical constants of the present sample differed considerably from those of Singapore patchouli oil, and more resembled those recorded for the Java product. The oil had a fairly good though not very intense aroma, and possessed a rather low solubility.

COMMERCIAL VALUE.

The oil was submitted to a firm of essential oil distillers in London, who described it as having a "rubber-like" odour which would reduce its value, and which they considered might be due to faulty distillation. If this defect could be remedied the commercial value of the oil would, in their opinion, be similar to that of the Java product.

APPENDIX No. 2.

IMPERIAL INSTITUTE,
LONDON, S.W.7,
9TH FEBRUARY, 1932.

REPORT ON PAPAIN FROM UGANDA.

The sample of papain which is the subject of this report was forwarded to the Imperial Institute by the Director of Agriculture, and is referred to in his letter No. 2734/877 of the 24th November, 1931. The material was stated to have been prepared on the Government Plantation, Kampala.

DESCRIPTION.

The sample, which weighed 4½ ozs., was in the form of coarse, light brown granules with a pronounced cheese-like odour. On shaking with water the resulting solution was almost colourless, but it became darker after standing for some hours. The sediment was practically free from dark brown specks.

RESULTS OF EXAMINATION.

The papain was found to be free from sugars and starch. Trials showed that it possessed a good proteolytic activity which was slightly superior to that of a standard commercial brand of papain used for comparison.

REMARKS.

The foregoing results show that the present sample is of satisfactory purity, of good colour and general quality and possesses a proteolytic activity equal to that of the ordinary commercial product. Consignments of similar papain should be saleable in the United Kingdom in competition with Ceylon supplies, the current price of which is about 4s. 3d. per lb. in London.

Native Agriculture—Estimate of Approximate Acreages of Crops under Cultivation, 1931.

Province and District.	Plantains.	Potatoes.		Millets.		Cotton.	Coffee.		Para Rubber.	Simsim.	Ground Nuts.	Chillies.	Maize	Rice.	Wheat.	Beans.	Peas.	Tobacco.	Sugar Cane.	Cassava.	Miscellaneous Crops.	Tannia.	Onions.
		Sweet.	English.	Mtama.	Wimbi.		Robusta.	Arabica.															
	ACRES.																						
Buganda :—																							
Mengo	300,000	60,000	200	700	1,000	145,285	2,700	170	100	4,000	6,000	70	10,000	50	...	30,000	600	...	1,500	50,000	500	...	...
Entebbe	90,000	20,000	300	500	...	70,349	4,300	600	28	1,800	4,000	100	3,000	3	...	10,000	450	200	1,800	25,000	...	...	...
Masaka	66,000	12,000	50	100	150	39,090	4,500	2,400	...	150	5,000	300	1,000	10	2	9,000	600	30	100	6,300	...	...	.
Mubende	40,000	60,000	200	3,000	12,000	36,941	2,000	300	80	5,000	8,000	50	10,000	7	...	11,000	100	800	300	40,000	...	...	..
Total ...	496,000	152,000	750	4,300	13,150	291,665	13,500	3,470	208	10,950	23,000	520	24,000	70	2	60,000	1,750	1,030	3,700	121,300	500	...	...
Eastern Province :—																							
Busoga	166,000	39,388	30	3,162	65,370	137,887	95	8	...	5,597	8,406	84	7,400	209	3	24,264	804	7	230	19,856	...	...	...
Budama	29,100	13,855	...	1,859	8,500	36,827	...	...	...	2,604	1,328	...	1,098	...	...	13,576	...	3	50	27,034	...	...	...
Bugwere	12,507	50,088	...	8,375	92,949	112,101	...	...	...	17,973	27,149	...	12,429	4,181	...	20,750	...	...	40	57,424	...	...	...
Bugishu	70,639	27,439	765	3,661	30,266	47,592	...	2,114	...	487	895	19	4,650	8	109	6,451	2,837	17	325	5,758	...	...	...
Teso	2,110	64,653	1	25,741	155,000	115,626	...	...	...	21,581	19,325	4	3,212	324	...	38,003	14	8	10	68,447	1,674	...	...
Lango	47	36,084	...	17,732	83,400	52,483	...	...	...	59,730	6,320	...	501	6	...	13,260	36,951	...	...	25,732	...	...	...
Karamoja ...	...	400	...	13,000	1,000	...	...	...	...	400	500	...	10	...	...	100	...	500	...	10	...	...	...
Total ...	280,403	231,907	796	73,530	436,485	502,516	95	2,122	...	108,372	63,923	107	29,300	4,728	112	116,404	40,606	535	655	204,261	1,674	...	...
Northern Province :—																							
Bunyoro	9,000	24,000	100	5,000	18,000	16,550	200	230	...	14,000	2,200	10	2,000	2	3	15,000	1,380	1,200	75	6,000	750	..	...
Gulu	29	15,249	2	7,340	16,300	26,200	...	...	...	20,600	2,921	21	191	27	...	3,200	2	13	...	14,932	...	...	...
Chua	...	20,000	1	...	25,014	12,248	...	...	...	27,307	8,823	...	52	...	...	16,733	...	...	...	21,506	2,310	...	...
West Nile... ...	125	35,000	20	73,000	80,500	5,050	2	220	...	46,500	1,100	50	210	200	...	28,000	13,000	...	100	33,000	100	...	...
Total ...	9,154	94,249	123	85,340	139,814	60,048	202	450	...	107,807	15,044	81	2,453	229	3	62,933	14,382	1,213	175	75,438	3,160	...	...
Western Province :—																							
Toro	48,000	24,000	120	3,000	9,600	4,847	360	85	...	100	600	2	2,000	40	180	4,800	190	15	120	6,000	...	2,000	120
Ankole	33,000	17,406	50	9,650	4,658	6,183	...	1,221	...	5	1,100	...	2,555	...	...	8,117	1,521	434	6	394	150	...	...
Kigezi	8,000	30,000	100	25,000	50,000	...	...	150	...	50	10	...	10,000	...	10	22,000	10,000	10	25	250	...	...	...
Total ...	89,000	71,406	270	37,650	64,258	11,030	360	1,456	...	155	1,710	2	14,555	40	190	34,917	11,711	459	151	6,644	150	2,000	120
Grand Total ...	874,557	549,562	1,939	200,820	653,707	865,259	14,157	7,498	208	227,284	103,677	710	70,308	5,067	307	274,254	68,449	3,237	4,681	407,643	5,484	2,000	120

In the Eastern Province the estimates of acreages are based on sample plot measurements made in all districts.

Total 4,340,928 acres.

APPENDIX No. 4.

Livestock, 1931.

Province and District.	Cattle.	Sheep.	Goats.	Horses.	Mules.	Donkeys.	Pigs.
BUGANDA :—							
Mengo	65,163	33,383	216,479	3	...	...	250
Entebbe	23,228	11,154	52,684	2	...	...	150
Masaka	58,855	10,612	38,175	...	...	...	50
Mubende	30,062	15,920	95,150	...	...	...	...
TOTAL	177,308	71,069	402,488	5	...	...	450
EASTERN :—							
Busoga	117,170	44,145	279,265	...	...	...	...
Budama	87,294	22,659	66,653	1	...	38	...
Bugwere	107,260	27,106	112,385	...	...	...	...
Bugishu	153,072	59,008	143,731	...	...	...	...
Teso	337,485	50,625	119,346	...	...	3	...
Lango	316,182	87,886	166,876	...	1	...	...
Karamoja	150,000	160,000	85,000	...	3	15,000	...
TOTAL	1,268,463	451,429	973,256	1	4	15,041	...
NORTHERN :—							
Bunyoro	6,647	10,544	46,174	...	...	1	...
Gulu	42,500	14,600	40,500	...	...	6	...
Chua	26,500	21,400	29,300	...	1	10	...
West Nile	188,000	93,000	232,000	...	4	8	...
TOTAL	263,647	139,544	347,974	...	5	25	...
WESTERN :—							
Toro	64,567	47,120	93,855	...	...	15	...
Ankole	194,448	98,420	155,405	...	...	5	20
Kigezi	96,312	100,000	140,000	...	...	2	...
TOTAL	355,327	245,540	389,260	...	...	22	20
GRAND TOTAL	2,064,745	907,582	2,112,978	6	9	15,088	470

European Agriculture, 1931.

APPENDIX No. 5.

Province and District.	Number of Estates.	Total Acreage taken up.	Total Acreage cultivated.	Coffee.		Para Rubber, Acres.	Tea, Acres.	Cotton, Acres.	Tobacco, Acres.	Miscellaneous, Acres.
				Arabica Acres.	Robusta Acres.					
BUGANDA :—										
Mengo ...	75	34,355	12,643	2,528	3,892	7,683	363	179	81	190
Entebbe ...	16	6,396	2,105	254	524	1,362	80	47	...	2
Mubende ...	12	7,470	1,105	852	170	30	173	60	65	...
Masaka ...	23	7,037	1,350	872	464	200	...	...	...	...
TOTAL ...	126	55,258	17,203	4,506	5,050	9,275	616	286	146	192
EASTERN :—										
Busoga ...	8	9,182	710	297	392	30	...	...	...	270
WESTERN :—										
Toro ...	62	26,436	3,875	3,779	61	...	18	...	15	17
NORTHERN :—										
Bunyoro ...	24	13,037	3,212	1,749	588	1,258	5	...	88	44
West Nile ...	2	400	120	100	...	...	...	...	20	...
GRAND TOTAL ...	222	104,313	25,120	10,431	6,091	10,563	639	286	269	523

3,682 acres are interplanted areas.
Returns were received from 162 estates.
Returns were not received from 60 estates, and regarding these estates, figures from previous returns have been included in respect of the permanent crops.
29 estates in the above, comprising 12,628 acres, have no cultivation, are abandoned or have been presumed abandoned.
The above acreage of para rubber includes areas denoted as closed but which may be re-opened if tapping becomes economic.

APPENDIX No. 6.

Asiatic Agriculture, 1931.

Province and District.	Number of Estates.	Total Acreage taken up.	Total Acreage cultivated.	Coffee		Para Rubber, Acres.	Sugar Cane, Acres.	Sisal, Acres.	Miscellaneous, Acres.
				Arabica, Acres.	Robusta, Acres.				
BUGANDA :—									
Mengo ...	21	16,766	6,675	220	525	800	5,590	...	...
Entebbe ...	8	2,393	154	82	6	66	...	...	...
Mubende ...	3	1,537	20	...	...	10	...	...	10
Masaka ...	4	2,402	587	5	60	320	125	...	77
TOTAL ...	36	23,098	7,436	307	591	1,196	5,715	...	87
WESTERN :—									
Toro	2	585	74	74	...	...	...	...	...
NORTHERN :—									
Bunyoro ...	2	10,099	1,200	...	...	...	...	1,200	...
EASTERN :—									
Busoga ...	8	13,214	3,615	25	40	700	2,850	...	...
GRAND TOTAL ...	48	46,996	12,325	406	631	1,896	8,565	1,200	87

460 acres are interplanted areas.
Returns were received from 26 estates.
Returns were not received from 22 estates, and regarding these estates, figures from previous returns have been included in respect of the permanent crops.
23 estates in the above, comprising 11,448 acres, have no cultivation, are abandoned or have been presumed abandoned.

APPENDIX No. 7.

Comparative Statement of Uganda Produce Exported
FOR THE YEAR ENDED 31ST DECEMBER, 1931.

ARTICLES.	Unit.	From 1st January to 31st December, 1931.		From 1st January to 31st December, 1930.		INCREASE.		DECREASE.	
		Quantity.	£	Quantity.	£	Quantity.	£	Quantity.	£
Cotton, Raw ...	... *centals*	755,680	1,503,307	516,489	1,555,344	239,191	...	...	52,037
„ Seed ...	... *tons*	45,435	149,224	33,578	137,387	11,857	11,837	...	...
Coffee, Hulled ...	... *cwts.*	68,775	159,442	46,131	148,577	22,644	10,865	...	...
„ Parchment ...	... „	1,121	1,864	1,872	5,110	...	...	751	3,246
„ Unhulled ...	... „	94	83	853	1,308	...	...	759	1,225
„ Prepared ...	... „	...	...	2	16	...	...	2	16
Rubber, Plantation ...	... *centals*	1,334	2,291	6,270	16,814	...	...	4,936	14,523
Tobacco, Unmanufactured	... *lbs.*	133,597	5,185	123,659	5,544	9,938	...	...	359
„ Cigarettes ...	... „	46,474	12,345	20,707	5,405	25,767	6,940	...	...
Chillies	... *cwts.*	2,814	5,515	3,078	7,573	...	...	264	2,058
Jaggery (Unrefined Sugar)	... „	82	53	195	168	...	...	113	115
Sugar, Refined ...	... „	44,995	46,576	6,670	8,718	38,325	37,858	...	...
Groundnuts ...	... *tons*	215	2,076	1,289	15,123	...	...	1,074	13,047
Sim Sim, Seed ...	... „	350	3,799	1,416	17,964	...	...	1,066	14,165
„ „ Oil ...	... *Imp. gals.*	320	48	2,522	467	...	...	2,202	419
Ghee (Clarified Butter)	... *cwts.*	23	56	11	53	12	3	...	...
Oil Seed Cake ...	... *tons*	37	139	205	1,180	...	...	168	1,041
Skins, Sheep and Goats	... *No.*	130,670	5,226	205,200	7,670	...	...	74,530	2,444
„ Miscellaneous ...	... „	577	42	5	11	572	31	...	...
Hides, Dry and Dry Salted	... *cwts.*	19,799	36,696	21,492	49,518	...	...	1,693	12,822
Ivory	... „	405	16,184	302	13,632	103	2,552	...	...
Hippo Teeth ...	... „	5	21	11	48	...	...	6	27
Horns	... „	...	30	25	1,620	...	...	25	1,590
Tin Ore	... *tons*	170	24,136	351	55,300	...	...	181	30,864
„ Manufactured, unenumerated	... *value*	...	...	...	4	...	...	...	4
Methylated Spirits ...	... *Imp. gals.*	1,354	254	1,212	218	142	36	...	...
Rectified Spirits ...	.. „	108	32	42	10	66	22	...	...
Timber	... *cub. ft.*	3,697	725	2,501	603	1,196	122	...	...
Maize	... *cwts.*	603	85	560	127	43	..	...	42
Maize Meal and Flour ...	... „	...	...	1,541	659	...	...	1,541	659
Tea	... „	26	130	10	85	16	45	...	...
Goods, Manufactured, unenumerated	*value*	...	357	...	727	...	...	...	370
„ Unmanufactured „	... „	...	22	...	74	...	...	...	52
Miscellaneous Exports	... „	...	2,019	...	3,397	...	...	...	1,378
TOTAL ...	£	...	1,978,262	...	2,060,454	...	70,311	...	152,503

Net decrease :—£82,192.

Comparative Statement of Exports from the Uganda Protectorate.

ARTICLES.	Unit.	Year ended 31st December, 1927.		Year ended 31st December, 1928.		Year ended 31st December, 1929.		Year ended 31st December, 1930.		Year ended 31st December, 1931.	
		Quantity.	£	Quantity.	£	Quantity.	£	Quantity.	£	Quantity.	£
Cotton, Raw	*Centals*	526,911	1,690,838	553,944	2,475,327	816,228	3,312,667	516,489	1,555,344	755,680	1,503,307
,, Seed	*Tons*	29,500	170,303	45,506	323,110	67,523	424,000	33,578	137,387	45,435	149,224
Coffee, Raw	*Cwts.*	43,514	170,407	40,355	164,187	...	...	...	...	...	...
,, Hulled	,,	...	...	...	...	34,626	155,298	46,131	148,577	68,775	159,442
,, Parchment	,,	...	...	...	...	5,996	20,552	1,872	5,110	1,121	1,864
,, Unhulled	,,	...	...	...	...	570	1,286	853	1,308	94	83
,, Prepared	,,	...	...	...	...	½	6	2	16	...	...
Rubber, Plantation	*Centals*	14,463	82,077	11,312	54,978	8,231	28,818	6,270	16,814	1,334	2,291
,, Wild	,,	33	84	...	...	...	...	...	...	...	...
Tobacco, Unmanufactured	*lbs.*	...	...	8,539	327	61,967	3,040	125,659	5,544	133,597	5,185
,, Cigarettes	,,	...	...	...	...	114	26	20,707	5,405	46,474	12,345
Chillies	*Cwts.*	1,308	4,359	4,437	25,848	6,174	26,133	3,078	7,573	2,814	5,515
Jaggery (Unrefined Sugar)	,,	436	425	125	130	97	103	195	168	82	53
Sugar, Refined	,,	10,161	16,371	2,749	4,434	4,276	7,071	6,670	8,718	44,995	46,576
Groundnuts	*Tons*	2	40	150	2,636	316	5,419	1,289	15,123	215	2,076
Cacao, Raw	*Cwts.*	64	160	2	6	4	12	...	...	...	...
Simsim Seed	*Tons*	718	13,732	115	2,162	1,338	24,890	1,416	17,964	350	3,799
,, Oil	*Imp. Galls.*	88	25	1,536	422	1,678	464	2,522	467	320	48
Ghee (Clarified Butter)	*Cwts.*	...	...	31	239	62	475	11	53	23	56
Oil Seed Cake	*Tons*	...	...	136	847	74	495	205	1,180	37	139
Skins, Sheep and Goats	*No.*	78,411	4,091	163,042	8,039	258,045	12,901	205,200	7,670	130,670	5,226
,, Miscellaneous	,,	...	...	202	14	78	49	5	11	577	42
Hides, Dry and Dry Salted	*Cwts.*	29,619	99,541	58,677	257,288	35,099	152,542	21,492	49,518	19,799	36,696
Ivory	,,	499	34,574	329	21,759	407	24,757	302	13,632	405	16,184
Hippo Teeth	,,	2	15	1	4	2¾	17	11	48	5	21
Horns	*lbs.*	448	453	336	722	231	639	2,800	1,620	...	30
Metalliferous Ores, non-ferrous	*Tons*	117½	20,875	252	50,673	...	...	...	...	...	...
Tin Ore	,,	...	...	...	...	324½	63,900	351	55,300	170	24,436
,, Manufactured, unenumerated	*Value*	...	...	...	...	...	...	...	4	...	...
Other Ores	*Tons*	...	...	...	...	4¾	271	...	...	...	...
Methylated Spirits	*Imp. Galls.*	638	96	543	94	1,418	287	1,212	218	1,354	254
Rectified Spirits	,, ,,	...	...	...	...	174	39	42	10	108	32
Timber	*Cub. ft.*	4,637	917	2,283	609	3,533	1,161	2,501	603	3,697	725
Maize	*Cwts.*	...	...	...	...	9,925	3,882	560	127	603	85
Maize Meal and Flour	,,	...	...	...	...	888	468	1,541	659	...	...
Tea	,,	...	...	...	...	12½	133	10	85	26	130
Goods, manufactured, unenumerated	*Value*	...	162	...	309	...	957	...	727	...	357
,, unmanufactured	,,	...	62	...	293	...	781	...	74	...	22
Miscellaneous Exports	,,	...	633	...	810	...	1,216	...	3,397	...	2,019
TOTALS		...	2,310,260	...	3,395,267	...	4,274,755	...	2,060,454	...	1,978,262

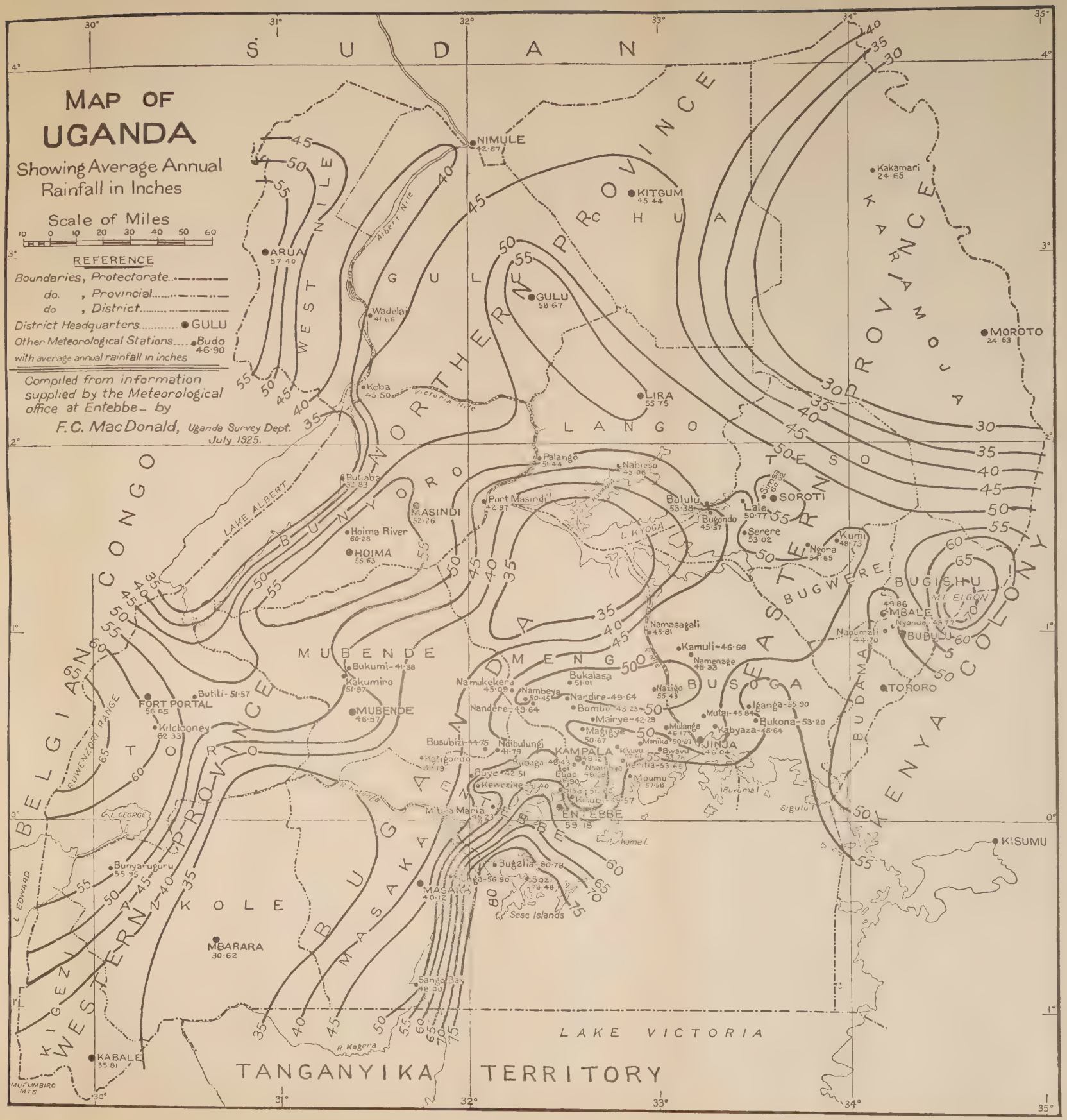
Details of Machinery at Ginneries in the Uganda Protectorate—1931 Season.

Province and District.	Ginneries.		Gins.				Seed Openers.		Presses.				Engines.					
			Roller.		Saw.				Hand.		Power.		Steam.		Oil.		Suction Gas.	
	Working.	Silent.	Working.	Silent.	Working.	Silent.	Working.	Silent.	Working.	Silent.	Working.	Silent.	Working.	Silent.	Working.	Silent.	Working.	Silent.
Eastern :—																		
Busoga	20	16	334*b*	93	3	23	21	11	4	11	16	1	17	9	5	6	1	...
Budama	4	3	60	23*c*	2	9	4	1	...	6	4	1	2	1	1	2	1	...
Bugwere	9	4	124	19	7	12	9	2	...	10	9	...	5	1	2	2	2	1
Bugishu	1	3	12	25	...	4	1	3	...	1	1	2	1	2	...	...	...	1
Teso	16	9	211*b*	71	10	7	16	8	1	11	16	1	7	4	...	2	10	3
Lango	9	8*a*	144*b*	63	6	9	10	5	1	6	9	3	9	5	1	1	2	1
Total ...	59	43	885	294	28	64	61	30	6	45	55	8	41	22	9	13	16	6
Buganda :—																		
Mengo	30	15	402	144	2	3	31	15	3	11	28	4	19	9	6	2	6	4
Entebbe	10	1	185	8	...	...	11	1	2	1	8	...	12	1	...	...	...	...
Masaka	8	2	129	10	...	2	9	1	1	...	7	...	9	2	...	...	...	...
Mubende	8	5*a*	89*b*	31	...	3	8	4	3	5	5	...	8	3	...	2	...	...
Total ...	56	23	805	193	2	8	59	21	9	17	48	4	48	15	6	4	6	4
Northern :—																		
Bunyoro	3	2	32	16*c*	1	...	3	1	...	2	3	...	3	1	...	1	...	...
Gulu	4	...	43	...	...	...	4	...	3	...	2	...	4	...	...	...	...	...
Chua	1	...	12	...	...	...	1	...	...	...	1	...	1	...	...	...	...	...
West Nile	1	...	...	...	4	...	1	...	...	...	1	...	1	...	...	...	...	...
Total ...	9	2	87	16	5	...	9	1	3	2	7	...	9	1	...	1	...	...
Western :—																		
Toro	1	...	6	...	...	...	1	...	1	...	...	...	1	...	...	...	...	...
Ankole	...	1	...	...	...	1	...	...	...	...	...	...	...	1	...	...	...	...
Total ...	1	1	6	...	...	1	1	...	1	...	...	...	1	1	...	...	...	...
Grand Total ...	125	69	1,783	503	35	73	130	52	19	64	110	12	99	39	15	18	22	10
	194		2,286		108		182		83		122		138		33		32	

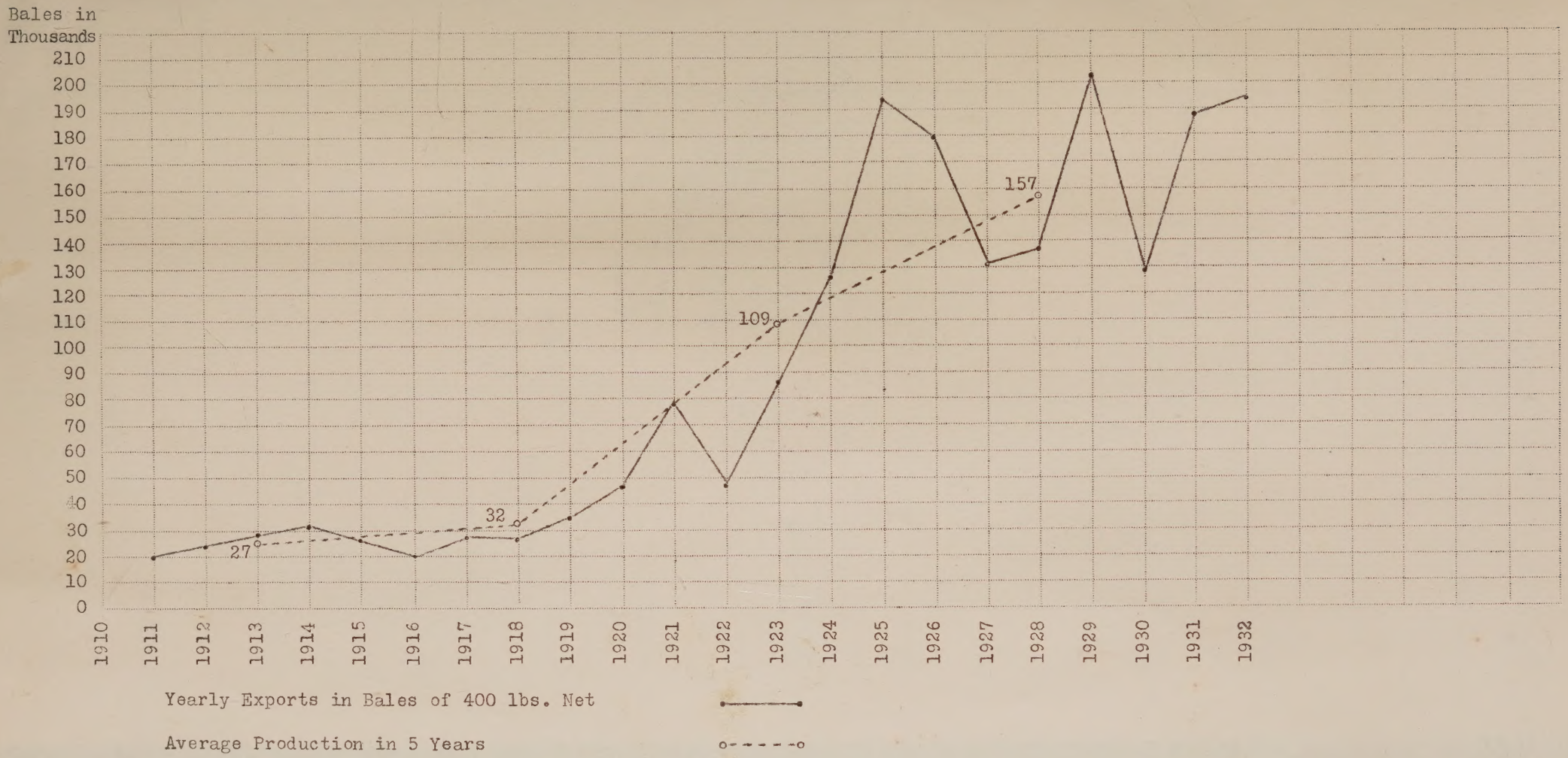
a Includes one licensed but silent.
b Includes Double Roller Gins : Busoga 7, Teso 12, Lango 20, Mubende 3—Total 42.
c Includes Double Roller Gins : Bunyoro 6, Budama 4—Total 10.

List of Circulars obtainable from the Director of Agriculture, Entebbe:—

3. DISEASES OF *HEVEA BRASILIENSIS* IN UGANDA.
4. DIEBACK OF *COFFEA ARABICA* IN UGANDA.
7. REPORT ON COFFEE CULTIVATION IN UGANDA.
14. *COFFEA ROBUSTA* IN UGANDA.
15. CULTIVATION AND PREPARATION OF *COFFEA ROBUSTA*.
16. COTTON EXPERIMENTS 1925—1926.
17. (A) THE OCCURRENCE OF ANGULAR LEAF-SPOT OF COTTON IN UGANDA.
    (B) ROT OF *HEVEA CORTEX* IN UGANDA.
18. RUBBER EXPERIMENTS ON THE GOVERNMENT PLANTATION, KAMPALA.
19. SUGAR CANE IN UGANDA.
20. NOTES ON THE CULTIVATION, CURING AND PACKING OF FIRE-CURED TOBACCO.
21. SOIL MANAGEMENT AND MANURING.
22. VARIEGATED COFFEE BUG (*ANTESTIA SPP.*)


MAP OF
UGANDA
Showing Average Annual Rainfall in Inches
Scale of Miles
10 0 10 20 30 40 50 60
REFERENCE
Boundaries, Protectorate
do. , Provincial
do , District
District Headquarters ● GULU
Other Meteorological Stations ● Budo 46·90
with average annual rainfall in inches
Compiled from information supplied by the Meteorological office at Entebbe – by
F.C. MacDonald, Uganda Survey Dept. July 1925.
SUDAN
NIMULE 42·67
KITGUM 45·44
Kakamari 24·65
MOROTO 24·63
ARUA 57·40
GULU 58·67
Wadelai 41·66
Koba 45·50
LIRA 55·75
Palango 51·44
Nabieso 45·06
Butiaba 43·83
Port Masindi 42·97
MASINDI 52·26
Hoima River 60·28
HOIMA 58·63
Bululu 53·38
Bugondo 45·37
Lale 50·77
SOROTI
Serere 53·02
Kumi 48·73
Ngora 54·65
MBALE 49·86
BUGISHU
MT. ELGON
BUBULU
Namasagali 45·81
Kamuli 46·66
Namenage 48·33
Nabumali 44·70
TORORO
Bukalasa 51·01
Namukekera 45·09
Nambeya 50·45
Nandire 49·64
Bombo 48·23
Mairye 42·29
Magigye 50·67
Mulange 46·17
Nazigo 55·43
Mutai 45·84
Iganga 55·90
Bukona 53·20
Kabyaza 48·64
MUBENDE
Bukumi 41·38
Kakumiro 51·97
MUBENDE 46·57
FORT PORTAL 56·05
Butiti 51·57
Kilcooney 62·33
Busubizi 44·75
Ndibulungi 41·79
KAMPALA
Monika 50·87
Kiwuuu 55·65
Bwavu 53·76
JINJA 46·04
Kabagondo 52·19
Ruboga 49·43
Nsambya 51·65
Kenitia 53·65
Buye 42·51
Budo 46·90
Mpumu 57·58
Kewezwe 51·40
Kisubi 51·80
Kitubi 49·57
ENTEBBE 59·18
Mitala Maria 49·23
Buvuma I.
Sigulu I.
Bugala 80·78
Sazi 78·48
Sese Islands
MASAKA 40·12
MBARARA 30·62
Sango Bay 48·03
KABALE 35·81
KISUMU
LAKE VICTORIA
TANGANYIKA TERRITORY
BELGIAN CONGO
WESTERN PROVINCE
NORTHERN PROVINCE
EASTERN PROVINCE
KENYA COLONY
BUNYORO
TORO
ANKOLE
KIGEZI
BUGANDA
BUSOGA
BUGWERE
BUDAMA
TESO
LANGO
ACHOLI
KARAMOJA
MUFUMBIRO MTS
RUWENZORI RANGE
LAKE ALBERT
Albert Nile
Victoria Nile
L. KYOGA
L. GEORGE
L. EDWARD
R. Kagera

UGANDA COTTON PRODUCTION GRAPH BASED ON EXPORT RETURNS



BRITISH EAST AFRICAN METEOROLOGICAL SERVICE.

CHART OF TOTAL RAINFALL FOR THE YEAR 1931.